The Builder.

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Some Account of Concrete Construction in America.

IN the practical application of scientific knowledge, our American cousins are invariably interesting and frequently instructive. Whether we look at the wonderful uses which they have made electricity subserve, or at the gigantic structures of steel and brick which scrape the American sky, we are struck with the energy and inventiveness of the people. Character displays itself in small things as well as great, and it is not surprising, therefore, to find in the comparatively small field of concrete construction much of interest and value. The Americans have taken up the science at the point where it was left years ago by Englishmen, and have carried it a step further by so simple a contrivance that one wonders how in the world Englishmen omitted to do it.

Thirty years ago attempts were made to combine wrought-iron and concrete in the construction of floors in such a manner that the properties of the two materials should have full play, the tensile strength of the iron combining with the compressive strength of the concrete to form an economical and theoretically strong construction. Both in France and in England the attempts were made, but, somehow or other, the system never "caught on," and we find, to-day, that it has been superseded by systems which are theoretically less perfect, and which are certainly more costly. Perhaps the experiments made by that clever inventor, Mr. Thaddeus Hyatt, in 1877, tended to throw doubt on the practicability of getting iron and concrete to work in harness together. Certainly his experiments showed that plain bars and rods of iron could not be trusted to do their share of the work, for they were more frequently "pulled through" than broken. Various methods of preventing this drawing of the ties were tried by Mr. Hyatt, including turning up the ends in the case of bars and screwing nuts on the ends in the case of rods, threading cross-rods through the bars, &c.

But when all was said and done, architects failed to adopt the system. The improbability of two such different materials working together in entire concord seems to have been too much for the faith or courage of architects. A few bold spirits, pinning their faith to theory, have employed modifications of the system, and have not suffered for their boldness; but speaking generally it may be said that architects have left the pretty theory severely alone. In Mr. Sutcliffe's book on "Concrete: Its Nature and Uses," which was expanded from a series of articles in our own columns, the subject is considered at some length, but on the whole the literature concerning the matter is very meagre. It has been left for an American to devise a kind of rod, simple and cheap, and yet so formed that, as the most unimaginative architect can see at a glance, it cannot be pulled through the concrete, but must bear its share of the stresses throughout the whole of its length. Mr. Ernest L. Ransome is the ingenious American, and his invention is nothing more than the twisting of a square rod, as shown in Fig. 1.

FIG. 1.—*Square Twisted Iron Rod.*

Although Mr. Ransome's invention is unknown in England, it is no novelty now in the United States, for it was patented there no less than eleven years ago, and has been used since in all manner of buildings, including the Leland Stanford Junior Museum, at Palo Alto, in California, which, says Mr. G. W. Percy, is "probably the largest and most important building in the world constructed entirely of concrete." As the years have passed new patents have been taken out by Mr. Ransome in connexion with his system of construction, so that to-day the Ransome & Smith Company holds nearly thirty patents for concrete-building apparatus, mixing machines, and for the application of the Ransome system to the construction not only of floors, but also of sewers and other conduits, illuminating tiling, facing-concrete, &c. In the short space of one article it will be impossible to describe fully all these inventions, but something may be said of the most important, and of those which are especially interesting to architects and builders.

It is well-known that the tensile strength of cement-mortar and concrete is sometimes only about one-twentieth of its compressive strength. The average ratio, however, between the two is usually considered to be as one to ten or as one to twelve. Roughly speaking, the ultimate compressive strength of good Portland cement concrete (one cement to four aggregate) may be said to be 2,000 lbs. per square inch, and the tensile strength 180 lbs. A material with such properties is evidently ill-adapted for resisting the transverse stresses which occur in flat floors and beams. No wonder that ingenious men dreamt of the possibility of employing wrought iron (with its tensile strength of 56,000 lbs. per square inch) to eke out the feeble tensile resistance of the concrete. A bar of iron one inch square has as great a resistance to tension as a bar of concrete five or six inches square has to compression. Such are the data. To apply them properly it is essential that the iron and concrete should work together, and this is most surely accomplished by binding the two firmly and equally throughout their length. It is clear that a square twisted iron bar, embedded in fine concrete, is bound to the concrete throughout its length; it cannot be "pulled through," and the concrete can only crack with the elongation of the iron.

The twisting of the iron has, however, another advantage besides that of furnishing an admirable bond with the concrete; it actually hardens the iron and increases its strength. It has long been known that the cold rolling of wrought-iron hardens and strengthens it; that is to say, the iron thus treated will not only resist a greater tensile stress, but also will elongate less before fracture. The tenacity of wire, drawn from iron which has a tensile strength of 25 tons per square inch, may be as much as 35 tons per square inch, a gain of 40 per cent. The twisting of an iron bar has exactly the same effect, and up to a certain limit the more the twists which are given to it per lineal foot, the greater is the increase of strength. Bars of "commercial iron," $\frac{3}{4}$-in. square, gained 5 per cent. with three-quarters of a twist per foot, 18 per cent. with two-and-a-quarter twists, and 24 per cent. with six twists. Norway iron $\frac{3}{4}$-in. square with six twists per foot gained 52 per cent.* And this increase of strength is coupled with an increased

* These figures are the results of tests made by Lieutenant Gilmore for the U.S. Government, and by th College of Mechanics of the University of California.

resistance to elongation, a point of great importance when the iron is used in conjunction with such a brittle material as concrete.

The leading idea of the Ransome system of concrete construction is simplicity itself, but a great amount of thought and ingenuity has been displayed in the application of the idea to the scores of purposes for which concrete may be used in buildings. We are all familiar with the Chicago method of embedding steel rails in concrete to form foundations for heavy structures, but in these it is the steel which does the work, while the concrete does little more than protect the steel from rusting. Fig. 2 shows a foundation of concrete and twisted iron, in

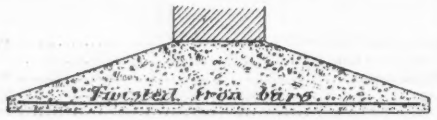


FIG. 2.—*Foundation of Concrete and Twisted Iron.*

which the iron, embedded in the lower part of the foundation (for the projections of the foundations are practically two inverted cantilevers), is calculated to resist the tensile stresses which tend to crack the foundation longitudinally, and the concrete is relied upon to bear the crushing stresses in the upper part of the foundation. It is said that "with twisted bars one inch square, placed 3 in. apart, and concrete of a maximum depth of 5 ft., this foundation would distribute a load of 50 tons per lineal foot, over a width of 30 ft., with safety upon any ground." There need be little fear that the iron bars will rust away and thereby lead to the failure of the foundation. The results alike of experimental tests and of actual experience show that iron is effectually preserved by being embedded in good concrete. Von Emperger has stated that in one case iron rods were quite free from rust after being in concrete for forty years.

The Ransome system of construction is also applied to walls, although, as these are subjected almost solely to compressive stress, the addition of iron is seldom necessary. It is, however, in the parts of buildings subjected to transverse stresses that the system is chiefly used, and, of these, floors are the most important. The consideration of this section of our subject is full of interest, for much sagacity has been employed in working out the details, both theoretical and practical. The simplest form of combined floor is a flat slab of concrete with twisted rods embedded in the lower part. Floors of this kind, but with plain rods or bars instead of twisted, have been occasionally used in England, but no systematic calculations have been made as to the materials required for different spans and loads. The Ransome & Smith Company has prepared a series of tables giving full particulars of the iron and concrete required for flat floors from 5 ft. to 20 ft. span, and for safe loads of 50, 75, 125, 250, and 500 lbs. per square foot. From these we have prepared the following table, which shows at a glance the details of such floors, calculated to bear a safe load of 125 lbs. per square foot in addition to the weight of the floor. The "depth" of the floor (see column 4) is the distance from the top of the floor to the centre of the iron bars; the "height" (column 5) is the total thickness of the floor, including the concrete below the bars. Quarter-inch auxiliary bars, we may add, are laid at right-angles to the others, about 3 ft. apart.

It will be noticed that the weight of iron in these floors is very little—about 1 lb. per sq. ft. for an 8-ft. span, 2 lbs. for a 14-ft. span, and $3\frac{1}{4}$ lbs. for a 20-ft. span. In most English systems of flooring, iron or steel *joists*, of more than twice these weights per square foot of flooring, would be used. It must be noted that the iron bars are protected underneath by only a very small thickness of concrete; in no case does this exceed five-eighths of an inch, and in the thinnest floor it is only three-eighths. We cannot help thinking that there is danger of the iron being damaged in a severe fire, even though this bottom layer of concrete is fine and rich in cement. Still, bearing in mind the many experiments on the fire-resistance of Portland-cement concrete, and, especially, remembering the comparative tests made in Berlin * on the "Monier" floor (which bears great resemblance to the Ransome system) and on floors containing fire-clay blocks and other contrivances, it would be rash to condemn the Ransome floor without a trial.

The most interesting development of this system is undoubtedly the floor with panelled soffit, shown in fig. 3. Considerable ingenuity has been displayed in designing the temporary wood scaffolding (or "false work" as the Americans call it) on which these floors are constructed. The panels are formed on collapsible boxes, the same width of box (namely 2 ft.) being used for all floors. The contrivances, by means of which the same boxes are used for floors of various depths, and by which the width of a box is eked out to form a wider panel when required, are clever but simple. Economy of labour in fixing and removing the temporary work has evidently been carefully studied. The panels may be of various lengths, say, from 5 ft. to 10 ft., cross rods and "beams" being introduced between each pair.

FIG. 3.—*Section of Floor of Concrete and Twisted Iron, for a span of 16 ft.* (*See Table II.*)

It will be noticed that the floor is practically the ordinary joisted and boarded floor reproduced in other materials. The "beam" of concrete with a twisted iron rod embedded in the lower part, takes the place of the wood joist, while the concrete forming the "thickness" of the floor takes the place of the boards. And just as laths and plaster are used to form the ceilings of wood floors, so wood or metal lathing and plaster, or even plaster without lathing, may be used to form flat ceilings under the concrete floor. Frequently, however, moulds are run around the panels and the floor itself is left to form a coffered ceiling, but this method cannot be recommended, as it will result in a terribly noisy floor. The breadth of the "beams" is made three times the thickness of the bars embedded therein, thus a $\frac{1}{2}$ in. bar would require a beam $1\frac{1}{2}$ in. broad, and an inch bar a beam 3 in. broad. As the boxes are uniformly 24 in. wide, the distance from centre to centre of the "beams" would be in the former case $24 + 1\frac{1}{2} = 25\frac{1}{2}$ in., and in the latter $24 + 3 = 27$. Tables have been prepared giving full particulars of floors to carry safe loads of 50 to 500 lbs. per square foot over spans varying from 11 to 30 ft., and to carry loads up to 125 lbs. per square foot over spans of 40, 50, and 60 ft. From these tables we have extracted the following figures relating to floors calculated to carry safe loads of 125 lbs. per square foot, re-arranging them so that they may be more easily compared with the figures given in Table I.

We have given the figures for the large spans as an American curiosity, and not with any idea that our readers will ever construct concrete floors nearly 6 ft. thick! The figures for the smaller spans, however, may prove useful. At the California Academy of Sciences, San Francisco, floors of this kind were used, and the architects, Messrs. Percy & Hamilton, state that they have proved entirely satisfactory. "One section," they add, "15 ft. by 22 ft., has been tested with a uniform load of 415 lbs. per square foot, and the load left on one month; the deflection at the center of the 22 ft. space was only $\frac{1}{8}$ in. We estimate the saving in this construction over the ordinary use of steel beams and hollow tile arches of the same strength, and with similar cement-finished floors on the top, to be 50 cents. per foot, amounting to about 20,000 dols. in the building."

It is interesting to note the difference in weight between the panelled floors given in Table II. and the solid floors given in Table I.; for a 12 ft. span the solid floor weighs about 81 lbs. per square foot, while the other weighs only 25 lbs. This saving of material and of dead weight on walls, pillars, and foundations, is an important consideration.

Great care is taken in the manufacture of the concrete for the Ransome floors. The Portland cement must develop a tensile strength of not less than 350 lbs. per square in. in seven days. The aggregates, it is said, "should be of any of the following substances, which are named about in the order of merit, the first being the best: hard limestone rock, hard clinker brick, hard broken pottery, granite or basalt, hard clinkers, broken flint or other hard rock, gravel. Care should be taken to use neither dirty nor soft clayey rock." The method of preparing and laying the concrete is thus described:—"The aggregates should be broken so as to pass through an inch ring, and the fine

* See the *Builder* for July 29, 1893.

TABLE I.—*Flat Floors of Concrete and Twisted Iron, calculated to bear safe loads of 125 lbs. per square foot.*

1 Span in feet.	2 Size of twisted bars in in. sq.	3 Distance between bars in in.	4 "Depth" in in.	5 "Height" in in.	6 Approximate weight of floor per sq. ft. in lbs.	7 Approximate cement per 100 sq. ft. in lbs.	8 Approximate aggregate per 100 sq. ft. in cub. yds.	9 Approximate iron per 100 sq. ft. in lbs.
5	$\frac{1}{4}$	5	$2\frac{1}{2}$	3	36	720	1·08	63
6	$\frac{1}{4}$	$4\frac{1}{2}$	3	$3\frac{1}{2}$	42	840	1·26	69
8	$\frac{1}{4}$	11	4	$4\frac{1}{2}$	57	1,140	1·71	108
10	$\frac{1}{4}$	9	5	$5\frac{1}{2}$	69	1,380	2·07	132
12	$\frac{1}{4}$	7	6	$6\frac{1}{2}$	81	1,620	2·43	165
14	$\frac{1}{2}$	6	$7\frac{1}{2}$	$8\frac{1}{2}$	99	1,980	2·97	193
16	$\frac{1}{2}$	5	$8\frac{1}{2}$	$9\frac{1}{2}$	111	2,220	3·33	230
18	$\frac{1}{2}$	$9\frac{1}{2}$	$10\frac{1}{2}$	$11\frac{1}{2}$	138	2,760	4·14	270
20	$\frac{1}{2}$	8	$11\frac{1}{2}$	$12\frac{1}{2}$	150	3,000	4·50	320

TABLE II.—*Panelled Floors of Concrete and Twisted Iron calculated to bear safe loads of 125 lbs. per square foot.*

1 Span in feet.	2 Size of twisted bars in in. sq.	3 Distance between bars in in.	4 "Depth" in in.	5 "Thickness" in in.	6 Approximate weight of floor per sq. ft. in lbs.	7 Approximate cement per 100 sq. ft. in lbs.	8 Approximate aggregate per 100 sq. ft. in cub. yds.	9 Approximate weight of iron per 100 sq. ft. in lbs.
12	$\frac{3}{8}$	$26\frac{1}{2}$	7·5	$1\frac{1}{2}$	25	487	·64	91
14	"	"	10	"	28	537	·7	"
16	1	27	8·75	2	38	713	·95	165
18	"	"	10·5	"	40	760	1	"
20	"	"	13·25	"	45	834	1·1	"
25	$1\frac{1}{4}$	$27\frac{3}{4}$	15	3	60	1,173	1·6	250
30	"	"	22·5	"	71	1,496	2	"
40	2	30	21	$6\frac{3}{4}$	129	2,494	3·3	593
50	"	"	38	"	167	3,238	4·3	"
60	"	"	69·5	"	243	4,750	6·2	"

dust removed by washing or screening (washing preferred). In mixing add sufficient water to bring the mass into a stiff, tenacious, viscous condition, and tamp it thoroughly into place. Fill the mould up to the line of the bar with a mixture of one of cement to three of aggregates not larger than a pea, lay the lower iron bars on this mixture and tamp them down into it, then fill up with a concrete composed of one part cement and three parts aggregates. . . . . It is of vital importance that no stop be made in the placing of the concrete from the time the 'beam' is begun until the 'thickness' of the beam is in place, and a thorough joint is made. The web and the thickness must be one solid piece of homogeneous concrete." These instructions are excellent as far as they go, and will prove useful in laying all kinds of concrete floors in which the concrete has to bear the whole or a considerable share of the load. The nature, size, and cleanliness of aggregates are points which are too often considered of trifling moment.

Space forbids us entering upon a description of the application of the Ransome construction to roofs, girders, sewers, pavement-lights, &c., but we have said enough to show that American ingenuity has succeeded in compelling iron and concrete to work together. The problem which has for so many years been attacked, has at length been solved, if not with theoretical perfection, at all events sufficiently for practical purposes.

NOTES ON IPSWICH.

AFTER a lapse of forty-four years, the British Association have again made the Town of Ipswich the seat of their Congress.

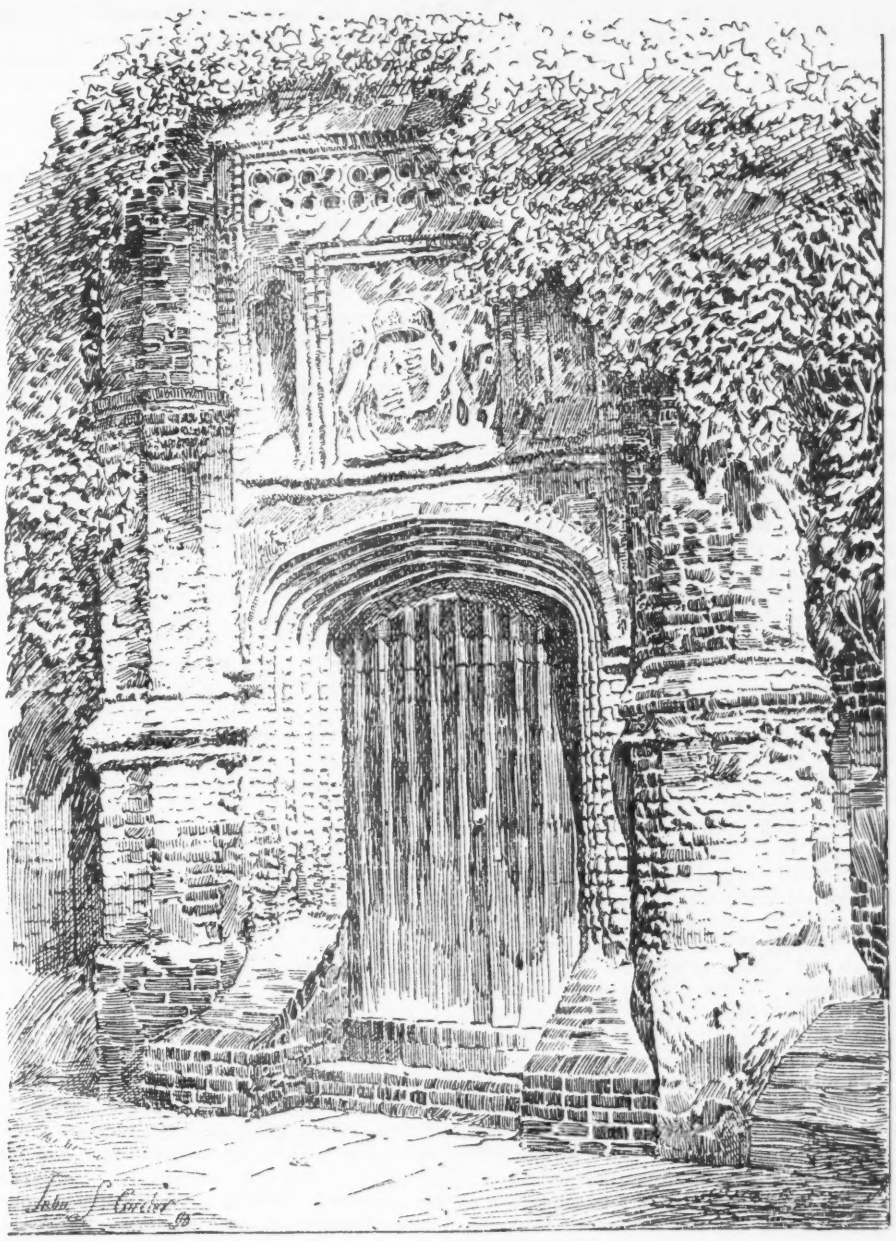
Though, as we have already observed, the place is a comparatively small one for such a meeting, it is not without its advantages. The town itself is very interesting historically, and contains within its confines much to attract the archæologist and antiquary, and the neighbourhood around presents matter of interest to many different classes of scientific students.

Of late years the development of Ipswich has been rapid, and since the census of 1841 it has increased by 35,000 inhabitants. As is well known, it stands on the banks of the Orwell, at the junction of the salt and fresh water, fourteen miles from the sea, and vessels of considerable tonnage can be navigated and unladen almost in the heart of the town. Ipswich possesses a long and important history, much of which has never been written. Its name has been a subject of much dispute. It is spelt in old documents "Gyppesewich," "Gyppeswic," "Gippsewiz," "Gipwic," "Yppsewiche," "Ippsewiche," and, lastly, "Ipswich"—the reasonable solution being that the "wich" is the Scandinavian *vik*, "a creek," and *Gip*, an individual or family.

Roman remains, pavements, and pottery have been discovered close to the town, and one thousand years ago it was of sufficient importance to attract the avarice of the Danes, and several ravages took place in the ninth and tenth centuries. It was then bounded by a mound and ditch, with palisade on the mound pierced by five gates, and small portions of this fortification still remain.

Money was struck at Ipswich as early as 946. In Richard I.'s reign the inhabitants purchased their freedom, and during John's reign they obtained a charter. From the reign of John to the present time Ipswich has flourished as a trading town, and during the fifteenth and sixteenth centuries was devoted to large weaving manufactures of woollen cloths, which the considerable influx of foreign refugees had stimulated in many parts of Suffolk. This foreign influence is seen in the carvings, &c., of the houses.

In early times the monastic rule was very prevalent in the neighbourhood; one of the first monasteries founded there being that of the Augustine Black Canons, who, just previously to 1177, founded the Priory of Christchurch, or Holy Trinity, and took the then existing church of Holy Trinity for their Priory worship. This Priory being dissolved in Henry VIII.'s reign, the site was sold eventually to Edmund Withipol, who built, in 1548, the mansion still existing, known as "Christchurch." Another Priory of the same foundation was that of St. Peter and St. Paul, which was given to Wolsey to found his college of St. Mary at Ipswich. The gateway of this latter still exists, and a sketch of it is subjoined. The whole of the college, with the exception of this gate, has disappeared, and no record remains of its size or character. It is supposed that this was not the principal gate, as it opens to the riverside of the site. It is a good specimen of Tudor brickwork, consisting of a richly-moulded doorway with hood-mould over it, above which is a panel of freestone much decayed, bearing the royal arms and supporters in high relief; on either side of this panel are niches for statues, and above the panel a row of quatrefoils. The doorway is flanked by octagonal pilasters, which were carried up and finished with finials, and in between the two flanking pilasters were three other finials springing from bases on the coping of the structure. Wolsey is said to have been born at Ipswich, but his birthplace cannot be pointed out.



Wolsey's College Gate, Ipswich.

The church close to the gate, St. Peter's, is a fine Perpendicular structure with a curious Norman font similar to one in Canterbury. It is worth note that in excavating in the town ditch a few months ago remains of a very similar font were found.

There are four churches in Ipswich dedicated to St. Mary. St. Mary Key or Quay (Perpendicular) contains amongst other things a large Flemish brass to a merchant named Pounder, one of the finest engraved and enamelled plates in England; also an altar tomb to Henry Tooley (1551), merchant and portman, who was a large benefactor to the town. St. Clements (Perpendicular) contains many brasses and monuments, and is the burial-place of Thomas Eldred, who sailed round the world three times in the sixteenth century. St. Mary's tower was rebuilt twenty-five years ago by Mr. G. C. Bacon, the old church having become decayed. There are some curious brasses in the church, one with the old Ipswich arms. At St. Lawrence (Perpendicular) John Bottold built the new nave in 1461, and John Baldwin the chancel. The latter died in 1449, and his name is quaintly inlaid in the east wall in flints and stonework.

St. Margaret's is one of the most interesting churches in the town. It includes work both of the Decorated and Perpendicular periods, and has a fine hammer-beam roof, which was decorated in colour in the reign of William III., and some good windows, and a font of some interest. The church was originally built in the thirteenth century to accommodate the surplus population of the parish after Holy Trinity Church was taken by the Priory of Holy Trinity. Among the curiosities of this church are an ancient

cope, a stone coffin-lid, and also the tomb of the builder of Christchurch Mansion, before referred to. St. Matthew (Perpendicular) serves a parish which once contained four other churches, all now demolished. The existing church is the largest in the town, if measured by seating accommodation. The font is a fine one, but the interest of the church itself has been much impaired by restoration.

Of the other churches of the town, St. Mary Elms has a picturesque Tudor brick tower, and a fine Norman doorway with an ancient door and ironwork. St. Stephen's is a church which is mentioned in Domesday, but the present church is of Perpendicular date, and no remains of the Norman building are in existence. St. Nicholas (probably built on the site of the old church of St. Michael), is a curious church, mostly of Perpendicular date, but several ancient carved stones of Saxon work are preserved in it, one of them representing the combat of St. Michael and the dragon. Wolsey's father left a bequest to the church for painting the figure of the archangel over the high altar. St. Helen's (Perpendicular), much restored, boasts an old sun-dial over the south porch, with the signs of the zodiac on the plate, and contains also some good monuments. St. Mary Stoke, said to date originally from 970, consisted only of a narrow nave, which now forms the north aisle of the existing church, as it was restored and enlarged in 1872. The churches of Trinity, St. John, St. Michael, and All Saints, are modern buildings.

As most of our readers are aware, one of the most interesting architectural objects in the town is the old house known as "Sparrowe's House," in the Butter Market.* This was an old merchant's house, originally in Tudor style; there was a curious hammer-beam roof in a room in the attics, probably used as a chapel. In the interior are several old panelled rooms; one dated 1564, with a fine mantel, inscribed with the names of George and Margaret Copping; another, more elaborate, with the name "J. W. Sparrowe," and the date 1603. The exterior was re-fronted, plastered, and ornamented in the reign of Charles II.; the parget-work of this front is well-known as one of the most effective specimens in England, though the details are but rudely executed. Among other things of interest in the interior are some fine Dutch tile panels representing Mars and Pallas.

Christchurch mansion, built, as already observed, by Edward Withipol in 1548, is a quadrangular brick edifice, plain, but well-proportioned, with curved gablets. After the Withipols died out it came into possession of the Hereford's, and in 1734 became the property of the Fonnereau's, a Huguenot family. It is now the property of the Corporation of Ipswich. In the interior some panelling of Georgian date, and some curious wall-papers, are worth attention. Among other things to be seen in Northgate-street is "Pykenham's Gate," the entrance-gate to a mansion, with a porter's lodge over it, built in brickwork, by William Pykenham, in 1471. On the inner side it is half-timbered and has a curious small corner post.

The carved corner posts of Ipswich form a special feature of the town; there are nine of them still remaining; they have been specially illustrated in a volume of drawings by Mr. John S. Corder, of Ipswich; one of his drawings was reproduced in our issue for October 18, 1890, in illustration of a notice of the book.

In Silent-street and Cox-lane are to be seen some elaborate fifteenth-century traceried panels, and similar work is to be found in Soane-street and Bell-lane; in Foundation-street is the old "Fox and Goose," with a satirical carved panel; in Oak-lane is a fine Elizabethan carving representing a smith working a horse-shoe on the anvil. There are some fine old timber houses to be seen in Fore-street, St. Clement's (including the house of Eldred the explorer), and also in the neighbourhood of the Quay, where the principal merchants lived. At Mr. Murrell's, in St. Peter's-street, is a splendid specimen of a Jacobean plaster ceiling. Carved woodwork of various degrees of excellence is to be found on many houses besides those already mentioned, including a beautiful Gothic barge-board on a house in Turret-lane. The "Old Neptune Inn" is well worth a visit; it contains a room entirely lined with "linen-pattern" panelling, and several other features of interest.

Having given some brief account of the objects of archæological interest in the town, we may add a few words respecting a subject which will perhaps be of more interest to the scientific visitors to Ipswich—namely, the geological characteristics of the site and its neighbourhood. When geology was in its infancy the numerous fossils found in the locality at Sutton, Butley, Walton, Woodbridge, and nearer Ipswich itself attracted considerable attention. It was recognised in the earlier part of the present century that so far as the molluscan remains were concerned the majority of them were identical with species now living in the adjacent sea; others had their nearest living analogues in the Mediterranean, and later on, when these mollusca were studied in greater detail, it was ascertained that a few of them were extinct. A review of the whole subject led Sir Chas. Lyell, with the aid of M. Deshayes, the late Mr. Robt. Bell, and others, to found the nomenclature of one of those grand divisions of geological time, Pliocene—a term the significance of which is now recognised throughout the world. In fact, it may be said that had it not been for the prolific yield of fossils by the Crags (Red and Coralline) in the area, assisted by those of other places in East Anglia, the history of our later geological deposits which have to some extent formed a key to beds of similar age on the Continent and elsewhere must have remained a blank, or at any rate would be very obscure. During the past twenty years certain of the pits in these famous localities have been closed, principally on account of the decay of the coprolite industry. The British Association, however, have, we understand, had some of these re-opened on the present occasion to assist the studies of those interested in Pliocene geology—a circumstance, as we know, that will be taken full advantage of, especially by the foreign geologists present. Of the larger remains found in the district it may be noted that the mastodon (an elephant-like animal), and gigantic whales are the most prominent.

The actual formations represented are, in ascending order: (1) The Chalk; (2) Eocene (including the Lower London Tertiaries and London Clay; (3) Pliocene—Coralline and Red Crags, &c.; (4) Glacial beds; and (5) Post-Glacial. The Chalk and Eocene are not so readily accessible as in other parts of the London basin, and we have already alluded to the great interest centred in the Pliocene of the neighbourhood. The Glacial beds are remarkable as furnishing additional proofs of the very recent existence of Arctic conditions over our islands, and if the actual nature of the deposits did not proclaim their origin and meaning, the few fossils found—nearly all of Arctic genera—would be quite sufficient to do so. The Post-Glacial beds include gravels and brick-earth, found for the most part in the river-valleys.

Students of architecture present will be able to trace the influence of geology in modelling the chief features of the town in regard to its building materials. The deposits in the vicinity have long yielded several kinds of earth suitable for making bricks, and brick-making is one of the staple industries. Nearly all the houses are, therefore, of brick, and where freestone has been employed it was introduced from afar. The gravels and chalk near by have furnished the flints built into the walls here and there. These, and many other points, may be noticed by visitors who care to go into the subject.

* For illustration and description of Sparrowe's House, see the *Builder* for January 30, 1892.

BRITISH ASSOCIATION AT IPSWICH.

SIR DOUGLAS GALTON'S Presidential address to the British Association cannot, on the whole, be regarded as very satisfactory. The history of the foundation of the Association is a theme which has been worn threadbare by former occupants of the chair, and in part also by the Presidents of the different sections. It has formed the subject of many a magazine article; and the daily press, times without number, has expatiated upon it as opportunity offered. That portion of the discourse treating of "the state of science in 1831" is very superficial, and does not convey anything like an adequate idea of the condition of science at the time. The remainder of the address may be characterised as a miscellaneous and unclassified assortment of facts relating to several sciences, with especial reference to chemistry. Here and there it was prophetic, and "bordered on dreamland." Sanitary engineers are credited with giving us purer water and somewhat purer air than we used to have, as well as having improved the method of sewering towns. There was much room, however, for the further purification of town air, and the President expressed the opinion that we should suffer from fog so long as we kept refuse stored in our towns to furnish ammonia, or allowed street surfaces to supply dust—of which much consisted of powdered horse-manure—or so long as the products of combustion were sent into the atmosphere. "Therefore," he remarked, "when mechanical traction for vehicles in towns was adopted, one cause of fog would be largely reduced." The dirt from the street, it is true, contributes to the impurification of the atmosphere, but we think it is absurd to place this in the front rank; its effects form a comparatively insignificant proportion of the whole of the deleterious matters discharged into the air. In a secondary degree, apparently, it was admitted that black smoke from the kitchen was also guilty in this connexion, though the suggestion to use coke instead of coal in our houses with the object of mitigating the fog nuisance can hardly be endorsed as a truly scientific means of dealing with the matter. We very much doubt, moreover, whether the intolerable fumes given off during the combustion of coke would greatly improve the condition of affairs. Sir Douglas Galton states that so long as we retain the open fire in living-rooms he despairs of finding a fireplace, however well constructed, which would not be used in such a manner as to cause smoke. This, however, begs the question, and seems to indicate that the learned President has not kept himself abreast of the improvements made in constructing "smokeless" fire-grates in recent years. That some smoke must pass into the atmosphere through such grates goes without saying, but with proper care it may be reduced to the smallest quantity, the effects of which may practically be neglected. The evil would be largely remedied were every fire compelled to consume its own smoke. So long as people fix what kind of fire-grates they please in houses we shall have black fogs with us. Whether compulsion to adopt such grates falls within the range of practical politics remains to be seen. The President paid a fitting tribute to the new branch of investigation which deals with the microstructure of metals and alloys. This is destined to shed much light on the actual effects of the combination of different metallic substances, and will teach us how to make alloys to possess specific physical properties. The recent improvements in iron production were briefly glanced at, as also their effects in revolutionising the ocean carrying trade. It is to be regretted that the spirit of the times was not more clearly reflected by adequate allusion to the spread of scientific technology. There is, of course, a danger in compelling science to entirely subordinate itself to the wants of mankind — as over-zealous advocates of

technical education would make it do. All really great scientific discoveries, and those of the most practical character, have had their origin in philosophical conceptions inculcated by pure science. Even the, apparently, most insignificant discovery frequently turns out to be of much practical utility, and we trust the day is far distant when science shall cease to be studied for its own sake. All the same, there has been a general tendency in the past for scientists to be too exclusive, and the circumstance that science has so long been divorced from industry in many departments, must be the excuse for the misdirection of a considerable proportion of the funds now devoted to the purposes of technical education. That much money has been wasted during the past few years in the manner indicated was slightly touched upon in the course of the address, and we fully concur in the observations made. Whatever the merits of the discourse, all will deplore the fact that the President was suddenly taken ill during its delivery, though it is satisfactory to note that he had so far recovered at the end of the meeting to reply to the vote of thanks passed.

NOTES.

THERE can be no question that the recent Trades' Union Congress will be noticeable for something like a real attempt to make these congresses more actually the expressions of the opinions of the actual working man. The Parliamentary Committee, under the authority of the last Congress, altered the standing orders so as to exclude from the Congress persons not actually working at their trades or permanently attached as paid officials to a union. They were also altered so as to prevent Trade Councils from sending delegates, and to give greater voting power to the larger unions. On the first day of the Congress a motion was debated that the passing of these new standing orders was beyond the jurisdiction of the Committee, and that they should not be sanctioned till they had been approved by a resolution of the Congress. There can be no doubt that what was really in the minds of the Congress when the discussion took place was not whether the Committee had technically exceeded their powers, but whether or not the new standing orders were desirable. The Congress defeated the motion by a large majority, the voting, curiously enough, being taken in accordance with the Standing Orders which were under discussion. The practical result should be to make the Trades' Union Congress in future much more a meeting of actual working-men and less a debating place for mere doctrinaires. It is most desirable that working-men should have an opportunity of meeting and expressing freely their views in regard to their work and organisation. For some years past these congresses have had very little real importance, and have not shown the views of the mass of intelligent artisans. If the new Standing Orders enable the world to ascertain definitely the views of the great body of English artisans on a limited number of important and pressing questions of the day, the Cardiff Congress will have done a valuable piece of work, and may have laid the foundation for carrying on these annual meetings in a more sensible and practical spirit in the future, although the meeting which has just closed has been characterised by as much absurdity and fanaticism as any of its immediate predecessors.

IT is to be regretted that Parish Councils have not the power under the Local Government Act to establish and manage, or to take over and manage, bathing-places. But we believe that the Local Government Board have given their opinion on the question. A Parish Council may adopt the Baths and Washhouses Act, but what is needed is something simpler. In many country places rough bathing-places with sheds and screens can be erected at a small cost, and are very desirable from every point of view. It is just such plain and simple matters as these that a Parish Council can well look after. It would be very easy to amend the Act during next Session so as to enlarge the powers of Parish Councils in this respect, and to allow any expenditure to come out of the ordinary parish rate. It is becoming evident that Parish Councils have next to nothing to do, and they might well be entrusted with the duty of establishing and managing bathing-places or floating swimming-baths. These are very common all over the Continent, but even on the Thames are unknown, with the result that the English boy and man of the artisan class has little or no opportunity of learning to swim.

IN the pages of *L'Architecture* M. Chas. Mesnager calls attention to the threatened destruction of the chapel of the Jesuit Lycée at Rouen. The chapel, of which an interior view is given in connexion with M. Mesnager's letter, is a large one, almost a complete church in its proportions and plan. It is in the rather florid architecture characteristic of the Jesuit buildings of the Renaissance, but it is a building evidently of considerable power and originality of treatment. The piers, formed of clusters of pilasters carrying the usual Renaissance block of entablature, are connected by arches springing out of them at about one-third the height of the pilaster order, and terminating above in a balustrade or panelling level with the pilaster capitals, and carrying their line across. Above this the vaulting arch leaves another open space. The building is probably, as M. Mesnager says, full of faults of decorative detail, but it must be a striking interior as a whole, and whatever the reason for its proposed demolition (which is not stated) it is to be hoped that the question will be reconsidered.

SOME new premises recently erected in Euston-road, north-side, occupy the site of Messrs. Smart & Co.'s fringe and upholstery factory in Mundy's-yard, standing behind Nos. 268 and 270, which were two shops in alignment with the advanced frontage. On the front of the factory was a bas-relief, being the original, or a replica of it, that was at Coade's "artificial stone" manufactory in Narrow-wall, since Belvedere-road, Lambeth. Croggan & Co., who succeeded to Coade & Seeley at Lambeth, removed to Mundy's-yard, *circa* 1827, and afterwards to what was then Keppel-row, New-road, where their business passed to Austin & Seeley. Some statuary executed by the firm in the closing years of last century was made from the models and designs of the elder Bacon. In his lecture upon Terra-cotta, delivered at Carpenters' Hall in 1886, and reported in our columns of April 10 of that year, Mr. James Doulton cited many interesting facts concerning the work turned out by this manufactory, which we believe was established by Mrs. Coade, in 1769, at Lyme Regis. He said that the colossal figure of Britannia, on the top of the Liverpool Exchange, the frieze at the Italian Opera House, Haymarket (now pulled down), on the east front, a basso-relievo, by Bubb, of the Progress of Music, and the caryatides with other ornamental work at St. Pancras Church, came from thence.* In 1802 J. Sewell, of Cornhill, published a print, after S. Rawle, of the bas-relief, ascribed to Bacon, over the entrance of the works at Lambeth: a copy of the print is in the Soane Museum. The new premises in the Euston-road, and the adjoining warehouses lately built for a well-known firm of drapers and furniture-makers, stand on the site of an ancient building which in various old records is styled King John's Palace. Tolmer's-square, at the rear, marks the position of a reservoir belonging to the New River Company. This spot forms part of the background of Hogarth's "March to Finchley," wherein the appearance of men boxing reminds us that the once famous Broughton kept his amphitheatre close by the adjacent Tottenham Court Nursery.

* To these we may add: trophies of arms at the Tower; the Queen's guard-house, Buckingham Palace; and several barracks in England and Scotland; the arms at the Trinity House; a row of houses, Rochester; and the group of statues, Pelican Life Office, by De Vaare, after Lady Diana Beauclerk's vignettes for an edition of Dryden's "Fables."

WE observe that in the Staple Inn front of the Patent Office new buildings now being erected for the Office of Works by Mr. B. E. Nightingale, contractor, both the fashion and materials of the contiguous block are being followed. The new extension buildings have a frontage in advance of the old chambers of the Inn which they replace, and stand in alignment with the block on the garden terrace (facing the Hall), which is now occupied by the Patent Office, and was erected in 1843-4, of white Suffolk brick and stone dressings, after the designs of Wigg & Pownall, in the Renaissance style of *temp.* James I. It was occupied until lately by the Taxing Masters in Chancery, and by the Land Registry. The latter has been transferred to Lincoln's Inn-fields, south-side.

THE sanitary condition of the City of Exeter is the subject of a Report by Dr. W. W. E. Fletcher to the Local Government Board. It appears that for some years past the Board have experienced considerable difficulty in obtaining from the Town Council of Exeter any information as to the sanitary circumstances of that city, and chiefly on this account Dr. Fletcher was commissioned to visit the city and make a special Report. In regard to water supply this is not very satisfactory. The supply was originally by a private company formed in 1833 to supply Exeter with water from the River Exe. The works were extended in 1856, and in 1873 the intake was removed from its position below the junction of the rivers Exe and Culm to its present position some distance above the junction, and about a mile below the village of Brampford Speke. In 1878 the waterworks were acquired by the Corporation. The purity of the water is tested by analysis by the public analyst each quarter. The results of these analyses vary considerably, and there are times when the water cannot be considered as of good quality. Besides the village already mentioned, about a mile above the water-intake, there is also, three miles further up stream, the village of Thorverton, containing about 600 inhabitants, the sewage of which passes into a brook, which empties into the Exe. Seven miles further up stream is the outfall from the Tiverton Sewage Farm. At this farm the sewage from the east side of Tiverton, which portion has a population of some 6,500 persons, is said to be dealt with, but at the time of Dr. Fletcher's visit a large volume of untreated sewage was passing directly into the Exe. Other sources of water-pollution are mentioned in the Report. The state of sewage and house drainage is fairly good, though it can only be regarded as in process of reform. But a very bad report is given in regard to the insanitary condition of some of the house property. In the newer parts of the city it may be described as good, and in some parts the dwellings of the artisan class are very comfortable. Every grade of dwelling may be found, from these downward to hovels such as may be seen in the old part of the city near the river. Dr. Fletcher observes that he has never seen in a comparatively small area so many dilapidated, ill-ventilated, badly-lighted, and filthy dwellings as are to be found in this locality. In illustration, he mentions Stephen's-place, West-street, a narrow court containing eight houses, with no through ventilation, and only one water-closet, which was in a filthy state. The houses are unfit for habitation. After mentioning some others equally bad, Dr. Fletcher says: "Victoria Buildings, condemned, and

very properly so, by the Sanitary Committee, are being repaired, but it is questionable if such repairs should be allowed, seeing there is little air-space. Rather the opportunity should be seized of pulling them down and making an open space. These are only specimens of many similar places. The houses are frequently built of timber and plaster, and are crowded together; very many, although not back-to-back, have no through ventilation, and the houses, like their inmates, are dirty. . . . House accommodation for the lowest of the working classes in Exeter may, in short, be said to be as bad as it can be. The Town Council have erred in allowing repairs where demolition was the only remedy."

WE understand that Mr. Osborne Smith, architect to the Bodleian and the British Museum Libraries, has been instructed to design additional premises for the London Library, St. James's-square. These will be built at an estimated cost of 17,000*l.*, upon the site of some property adjacent, and will contain a reading-room, a committee-room, a students'-room, and staff offices. Established in May, 1841, by the united efforts of Mr. Gladstone, Lord Lytton, Lord Macaulay, Dean Milman, Carlyle, and James Spedding, with others, and opened at No. 49, Pall Mall, the Library was removed December, 1845, to Beauchamp House in St. James's-square, west-side, which had been that of Lord Amherst when Commander-in-Chief. Of that house (shared, until 1874, with the Statistical Society) and of some premises in Duke-street, in the rear, the subscribers bought the freehold, in 1879, for 21,000*l.* But owing to the continued success of the institution the committee find that their existing accommodation is quite inadequate to meet its rapidly increased requirements.

THE letters of the "Silly Season" in the daily papers are an even more plentiful crop than usual, and those correspondents who have taken up the line of meteorological observation have afforded us a curious example of the persistency of a popular fallacy in regard to the method of estimating and describing the apparent size of objects seen in the heavens. In the *Times* of the 6th Mr. A. Warren Melhuish described a meteor which he had seen as "appearing to be" a foot in width; another correspondent who signed himself "E. T.," described one which moved horizontally from east to west, "at 2 ft. (apparent) above the moon." The "apparent" inserted in a parenthesis is evidently regarded as an important concession to scientific accuracy of definition. It would be rather amusing to have an opportunity of cross-examining the writers of such letters as to the data on which they estimate an "apparent" distance of a foot in the sky. One hears such attempts at definition in conversation sometimes, but to meet with this confusion of ideas as to mensuration twice in print in the same column of a newspaper is rather too ridiculous. To say that any object appears a foot or a yard wide is a form of statement which can only be made in regard to what we judge to be the *actual* size of an object whose distance is approximately known; to give it as the *apparent* size to the eye of an object whose distance is unknown is merely referring to an arbitrary standard which varies with the fancy of each person; and unless Mr. Melhuish and "E. T." can agree exactly how many feet in circumference the celestial hemisphere "appears" to be, from horizon to horizon, and get the amount fixed by Act of Parliament, their selection of one foot or two feet ("apparent") is mere nonsense. There are two ways of roughly defining the apparent size of an object or a space seen in the sky; either by comparing it with heavenly bodies—*ex. gr.* "E. T." might have said that his meteor passed the moon at so many lunar diameters distance from it; or by giving the apparent number of degrees occupied in the semi-circle of the sky, which, like every other semi-circle, is supposed to be divided into 180 degrees. In other words, we can only deal in such a case with proportional and relative standards of measurement; a reference to "apparent" lengths of standard linear measurement is a mere delusion of the mind.*

CAMPANILE, MADISON SQUARE GARDENS, NEW YORK.

THE Campanile in the Madison Square Gardens is a well-known architectural object, here shown in a new light, as a solitary tower appearing to rise from behind a mass of bare trees in winter.

The tower is by Messrs. McKim, Mead, & White, architects, and is modelled after the Giralda, at Seville.

MAGAZINES AND REVIEWS.†

THE *Art Journal* opens with a descriptive and historical account of the two neighbouring old towns of Rye and Winchelsea, with illustrations from drawings by John Fullwood, R.B.A., which as one might expect, deal rather with the *ensemble* than the detail of the picturesque features in these relics of old-time prosperity. One would hardly gather, for example, from the sketch of Winchelsea Church that here is some of the best work of the Decorated Period to be found in Kent, whilst of the church at Rye no illustration is furnished, though the description is sufficient to induce any architectural reader to make a note of this as one shrine of pilgrimage at the earliest opportunity. Mr. Joseph Pennell continues his articles on "The Illustration of Books," and the particular division of his subject which he now reaches is of especial interest to our readers, commencing as it does the description of methods of drawing for reproduction in line, and dealing in a clear and comprehensive manner with the technique of pens, ink, and paper. Appreciative articles appear on two painters of diverse character, Telemaco Signorini, the Italian, and Edouard Manet, the Frenchman. Mr. J. M. O'Fallon deals with modern smith's work in an article on "Birmingham Decoratively Wrought Iron," with instances and an interesting description of some of the processes of modern wrought iron working. The examples illustrated are remarkable for intricacy and over-elaboration rather than for restraint or originality, a tendency to which too much latter-day metal work often tends. We are, indeed, forcibly reminded of a piece of work once shown us by one of the firms whose productions are amongst those instanced, which we were informed was the result of a challenge from a workman to the draughtsman of the firm in question that the latter could not design a piece of work which the former could not execute. We seem to be in presence of a constant struggle between designer and craftsman, the one to evolve the other to carry into effect veritable *tours de force* in metal, and as close an approximation as possible to a literal transcription of natural forms, which we need hardly say is a long way from the best traditions of either art or craft. As in ironwork so in linen-weaving, we are presented with what Mr. Lewis F. Day, in his description, rightly calls "A Tour de Force in Damask," an account, with illustrations, of a very remarkable design by Mr. Walter Crane of a cloth for a dinner-table, for which, with full appreciation of its beauty and cleverness, the writer feels almost bound to apologise by insisting that "it is necessary at this date to remind people that a tablecloth may be worth looking at." The notable collection of M. Emile Peyre, by this time, we hope, practically known to all our readers, is the subject of a short article on "Some New National Acquisitions." Some of the more remarkable of the fine collection of pictures belonging to Mr. Merton Russell Cotes, Mayor of Bournemouth, are illustrated, with a descriptive article, and show a wide catholicity of taste, which is not invariably to be found in the selection of a private art patron.

The painter honoured this month in *The Studio* by a fully-illustrated article is M. Boutet de Monvel, whose most characteristic work is probably to be seen in his drawings and portraits of entirely typical French children, although his abilities have been by no means confined to such subjects. The recent exhibition of "The Home Arts and Industries Association at the Albert Hall" is the subject of a wisely critical and well-illustrated article, in which the weaknesses as well as the successes of this well-meaning organisation are treated with judicial discrimination. "Newlyn as a Sketching Ground" is described by one of its habitués, Mr. Frank Richards, and, with all due allowance for the enthusiasm of a partisan, presents an attractive and enticing enough prospect. Mr. Arthur Silver's essays in the application of "Stencilled Fabrics for Decorative Wall-Hangings" show the possibilities of such methods, even if there is somewhat too pronounced a mannerism in the treatment of the subjects illustrated, accentuated perchance by the translation into black and white of designs amongst whose principal charms is the gradation of colour which the employment of stencilling admits. The interesting series of articles on the Japanese method of instruction in wood-carving is continued.

The *Artist* is chiefly occupied with the annual "National Competition of Schools of Science and Art and Art Classes, 1895," lists of the gold and silver medallists, extracts from the report of the examiners, illustrations of prize medal designs, and a critical article on the work generally filling the bulk of the number.

In the *Essex Review*, Mr. Fred. Chancellor, F.R.I.B.A., continues his "Notes on Essex Churches," and gives an account of the Church of St. John the Apostle and Evangelist, Little Leighs. This is a small church, but contains one of the most interesting monuments in the county, the effigy in oak of a priest in eucharistic vestments, under a richly cusped ogee arch, the spandrels filled with carving, and the hood surmounted by carved crockets, terminating in a boldly-carved finial. The arch rests upon clustered shafts with carved capitals, and the whole is flanked by two buttresses, the pinnacles of which are also richly carved. "The Priory Church of Little Dunmow" is described in an article by Mr. Alfred Hartley, A.R.P.E., whilst those interested in campanology will welcome the continuation of the tabular record of "The Church Bells of Essex."

Harper contains a highly interesting account in "Notes on Indian Art," by Edwin Lord Weekes, of typical examples of the various schools or styles of Indian architecture, with some excellent illustrations from drawings by the author, concluding with a brief notice of the School of Arts in Bombay and that in Lahore, both of which meet with the writer's approbation, especially for their maintenance of the traditions of the indigenous art of India.

Mr. Grant Allen's series of articles on "Evolution in Early Italian Art" is continued in the *Pall Mall Magazine*, and deals with the gradual development of grouping and treatment in those pictures that have the Madonna and Saints for their theme.

In the *Cornhill* is a short article on "Our Stone Crusaders," worthy of notice, as making mention of some out-of-the-way examples, but scarcely professing, still less achieving, a complete record or even a thoroughly typical selection. Nay, even the title-subject is not strictly adhered to, as part of the short space is occupied by descriptions of so far post-Crusade memorials as monuments of Elizabethan date. "About Amber" gives, in popular form, a fair account of the scientific aspect of this important fossilised pine product.

A temperate and well-considered article in *Macmillan* deals with the relative claims and advantages of "The Nicaragua and Panama Canals," and after a careful examination of the commercial, financial, and political aspects of the question, sums up in favour of the construction of a sea-level canal at Panama, by the joint action, and under the joint guarantee of the Great Powers.

The art treasures of Sheffield, or at least those contained in the Mappin Art Gallery, are described in the *Windsor Magazine*, and illustrated by a number of somewhat indifferent illustrations. One variety of bric-à-brac is treated upon in an article on "Some Famous Snuff-boxes," of which the examples illustrated are curious rather from their esoteric than their intrinsic interest. So,

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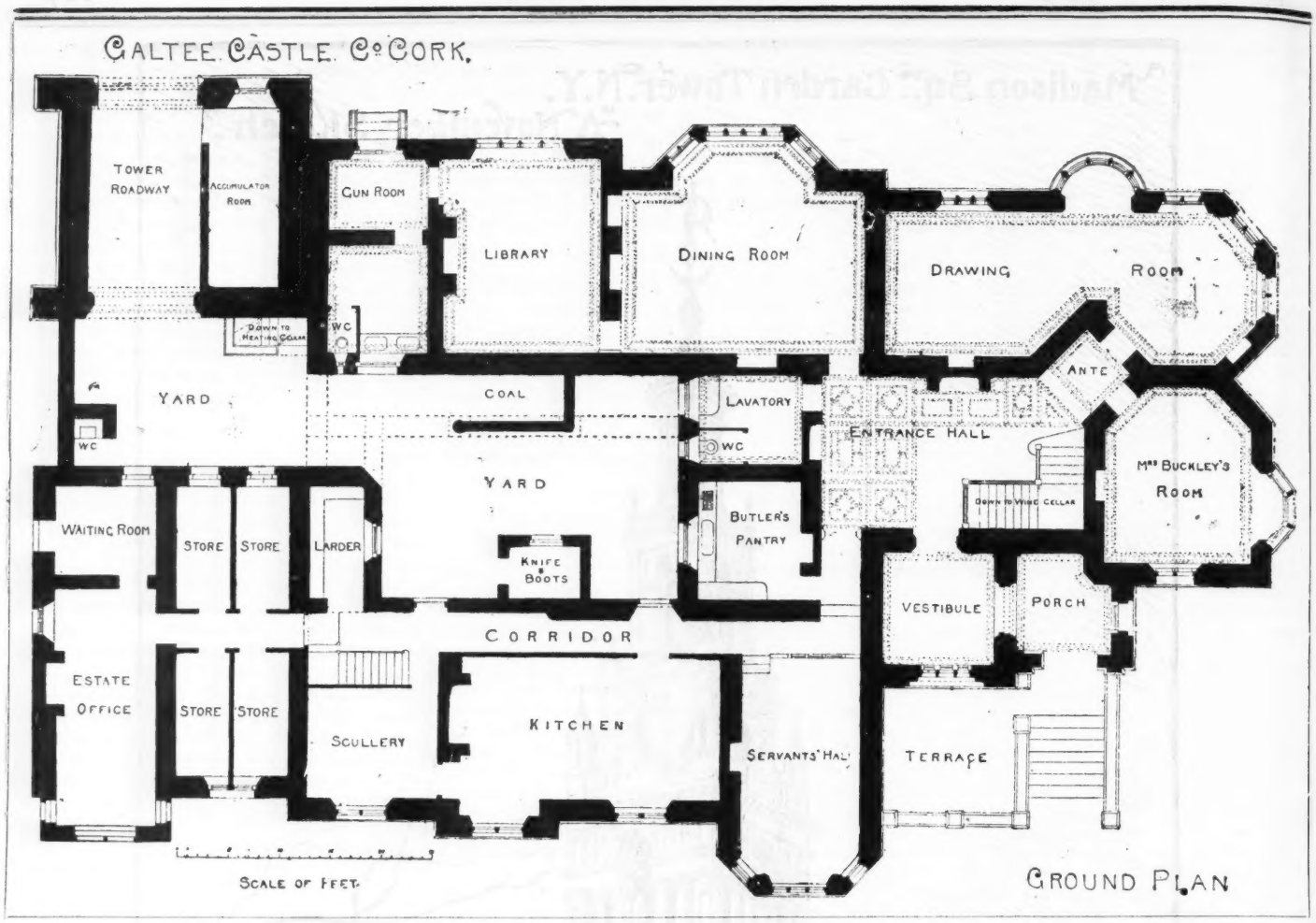
* It may be as well to add—lest we should be implicated in starting another popular fallacy—that the word "meteorological," used above to characterise the class of correspondence referred to, does not mean the same as "meteoric," although in the present instance it refers to letters on meteoric appearances.

† The object of these notes is to point out anything in the contents of the current magazines which is of special interest to our readers, with occasional brief criticisms on the views expressed in such articles. When a magazine which has been sent to us is not noticed, it is because that number contains nothing that it is within our province to comment upon.

Madison Sq.re Garden Tower. N.Y.
"A November Sketch."
E. Elwell Deane



too, in the article on "The Houses of Celebrated People," the instances cited are terribly lacking, on the whole, in architectural merit.

In the *Monde Moderne* is a capital account of the process of iron-casting, and a list of some of the chief foundries of France. In "Deux Petites Capitales Germaniques," we have an enticing description of Luxemburg and Sigmaringen, two of the many picturesque towns of West Central Germany. The paper on Archangel is also of some architectural interest. "La Chalcographie du Musée du Louvre," describes and illustrates some of the finest examples of the great French engravers.

The *Engineering Magazine* deals with "The Architecture of Modern Hospitals," on the text of some of the most recent examples of American work, with plans and views, supplemented for additional interest by illustrations of some Renaissance buildings of Italy, and of Greenwich and St. Thomas's Hospital, which serve as instances of the development of the modern hospital. It is interesting to notice, in view of quite recent expressions of some of our own leading hospital architects, that artificial ventilation by mechanical means is regarded as an uncontrovertible necessity for the modern American hospital. The Technical Index is a new feature, which is not without value in these days of high pressure in all departments of intellectual energy. The articles on "Surveying and Mapping a City," and "Revolution in Steel-making," deal with subjects that are of interest, and even importance, to many of our readers.

The *Englishwoman* has a description of York House, St. James's Palace, which, with a little history, is mainly composed of a running catalogue of the furniture and knick-knacks that go to furnish the home of the Duke and Duchess of York.

The pictures from *Punch* continue to recall to us the illustrations of the past, with reproductions from the work of Leech, du Maurier, Corbould, and Charles Keene, of whom there is this month an excellent portrait.

ARCHITECTURAL SOCIETIES.

SHEFFIELD ARCHITECTS AND SURVEYORS AND THE LATE TOWN CLERK.—At a meeting of the Council of the Sheffield Society of Architects and Surveyors on the 5th inst., the President, Mr. Charles Hadfield, in the chair, it was unanimously resolved: "That the Council of the Sheffield Society of Architects and Surveyors desire to convey to Mrs. Pye-Smith and her family an expression of their respectful sympathy in the loss which they have sustained by the death of the late Town Clerk of Sheffield. In all the intercourse between either the Society or its individual members and the late Town Clerk, his communications were characterised by the utmost courtesy, frankness, and reliability, which can now be looked back upon with satisfaction; while the ability and kindliness with which he transacted his official duties increased the personal regard which was entertained towards him, enhanced the dignity of the high office which he held, and promoted the honour and success of his native city."

COMPETITIONS.

WESLEYAN CHAPEL, SKELMANTHORPE. — Twelve sets of plans were submitted in competition for this chapel, and after several meetings the trustees selected those sent in by Mr. J. Berry, architect, 9, Queen-street, Huddersfield, who has since been engaged to carry out the work.

Illustrations.

GALTEE CASTLE.

GALTEE Castle is situated in co. Cork, about six miles from Mitchelstown, and at the base of the Galtee range of mountains. The present buildings occupy the site of a shooting-box, built by George, Earl of Kingston, in 1823, and occupy a commanding position at the head of a richly-wooded valley. The castle is backed by a deer-forest and wild moorland, the buildings are immediately surrounded by pine-forests, and the view we illustrate looks upon a beautiful valley, through which a trout-stream gently flows on its way to the river.

Galtee Castle is the residence of Mr. Abel Buckley, J.P., and has been built of red rubble stone with limestone dressings, both stones having been procured on the estate. The accommodation consists of an entrance-hall, dining and drawing rooms, boudoir, library, gun-room, and a billiard-room, with open timber roof and lantern light.

The buildings have been erected under one contract by Messrs. Wm. Brown & Son, of Salford; the joiners' work has been made in England, but the contractors have employed Irish masons and bricklayers, and some of the minor trades have been carried out by Irish labour. The Castle has been supplied with the electric light by Messrs. Drake & Gorham, of Westminster, who have secured the motive power by utilising the stream flowing through the valley. The whole of the works have been carried out under the superintendence of the architects, Messrs. Darbyshire & Smith, of Manchester.

DESIGN FOR DECORATION.

THE design for decoration of a morning room in wood and majolica by Mr. T. G. Cesare Formilli, is done chiefly to give a clear idea of how these two elements of decoration can be employed together in spite of their differing natures. The children's figures holding the festoons of fruit, which pass in the angles through metal rings, appear against a background of very low relief in majolica, so low as to be almost confused with the background of wood to which they are fastened, and thus further uniting these two elements of decoration. Some points of colour and of gold could be introduced on the wood, more especially near the outline of the majolica, to diffuse the colour all over the room. The walls are of tapestry, an overhead window being preferable, because the light is more regularly distributed and more symmetrically reflected on the majolica all round the room.

NORMAN DOORWAYS IN KENT.

THE County of Kent, which has two cathedrals within its boundaries, has long been referred to on account of the important examples of Norman architecture still existing within it, examples that are only equalled and not surpassed by any others in the kingdom.

The village churches in remarkable numbers present specimens of the architecture of the early date named, which are as important in their way as the rich and elaborate examples in the two cathedrals of Canterbury and Rochester. The doorways of Norman churches are almost always remarkable for their beauty and elaborate character, and the twelve specimens which we illustrate, all from Kent, are capital representative examples.

It would be an easy task to multiply the number, but much good would hardly result, for the examples given may be taken as specimens of the whole.

Bekesbourne.—This is an interesting doorway in a church of equal interest. The alternation of the enriched zig-zag course with the plain roll-moulding produces a capital effect by contrast.

Davington.—The doorway of this church is of late date, as is attested by the star ornament, which, in this example, is so prominent as to give the appearance almost of the dog's-tooth moulding of the subsequent style.

Borden.—Many examples exist of doorways of similar design to this at Borden. It is of plain character, standing in an external wall, which appears never to have had a protecting porch. The scallopings of the label indicate a moderately early Norman date.

Canterbury. — This doorway, shown in its restored state, is interesting not only from its associations, but from a curious fragment of the left-hand shaft, which is ornamented with a pattern of interlaced circles very similar to the pattern on the early font of St. Martin's Church, the ornamentation there being later than the font itself. A shattered fragment only remains, and there is still less of the right-hand shaft.

Bredgar is another example of an external doorway without a porch. It will be noticed that the shafts are not worked out of the solid, but are laid on only in the reveals in small stones.

Bridge.—This doorway is a very plain example in a church which is a remarkable study to the ecclesiologist. It should be visited, and its easy distance from Ashford renders it very accessible. It will be noted that the roll moulding is not worked out of the solid, but is only laid on after a plan far from uncommon in the county. And yet the roll moulding continues to exist!

St. Clement, Sandwich.—The tympanum here is very curious and Early. The church has quite out-grown its heavy Norman central tower.

St. Margaret's at Cliffe.—This doorway stands at the west front of a remarkable church, which consists of an Early Norman chancel and a large and later nave, the tower being at the west end. The work is very good, but the absence of a porch has caused much decay.

Ospringe.—This is a small side door in an interesting church.

Chislett affords an example of an Early tympanum now supported on a beam.

Betteshanger.—The north door still retains the small head of original work carved with zig-zag ornaments, and with a small figure within a vesica.

Books.

Light and Air. By BANISTER FLETCHER. Third Edition. B. T. Batsford, 94, High Holborn, W.C.

THIS work on "Light and Air," by Professor Banister Fletcher, is known to most of our readers, and a fair estimate of its just worth has been long ago arrived at. The third edition, to which we now refer, has recently appeared, and it may be said to contain, with little, if any, alteration, the whole of the matter contained in the second edition, with reports of additional recent cases and diagrams relating thereto at the end. The first of these cases is Slack *v.* Richmond and Smyth, in which the defence is stated explicitly, but not the cause of action. We infer, however, that the action referred to arose from an attempt to raise new buildings behind a row of trees which more or less affected the injured lights. The case could, in our opinion, have been stated in a much more concise form with a little more care. The case of Baillie *v.* Campbell refers to the addition of a story to an old building without the adjoining owner raising a complaint, and a successful action then being brought for injury, with a compensating verdict and costs. The case of Aldin & Co. *v.* Latimer Clark & Co. is rare, as the question of air was alone involved. The plaintiffs were timber-merchants, who successfully maintained an action, and obtained a verdict with costs, against the defendants, who had obstructed the air to their drying-sheds by a new building. This case is very scantily recorded. The author concludes his reference to recent cases by quoting Maynard *v.* the London School Board. The well-known text-books of Professor Banister Fletcher are amply padded with a personal element, which adds to the reader's amusement, though it does not increase the book's scientific value. "Surely," the author remarks in his preface, "with these added advantages, this must still continue to be the accepted text-book on the subject."

The Practical Surveyor: a Treatise upon Surveying. By THOMAS HOLLOWAY. Second Edition. Horace Cox, Bream's-buildings, E.C. 1894.

THIS useful little book on land-surveying in town and country, by Mr. Thomas Holloway, has been added to and revised in the second edition, which is now before us. Mr. Holloway evidently has an intimate knowledge of the subject of which he treats, and lays his knowledge before his readers in a plain, straightforward, and practical way which cannot be misunderstood by the youngest student to whom he appeals, and the plentiful use of diagrams contributes to this end. Mr. Holloway's book is essentially an elementary treatise on the subject, and the author refrains from dealing with the more intricate scientific instruments for surveying, and recommends the student to resort to an experienced surveyor for a lesson with the instrument before him. Those who are acquainted with surveying instruments will recognise the wisdom of the advice. This is a reliable elementary treatise within the reach of all students of the subject; it will also be a useful addition to the library of an architect who is not constantly engaged in land surveys, but to whom a certain knowledge of the subject is indispensable.

Practical Guide to Sanitary Legislation. By J. A. ANGELL and J. G. MORLEY. London: 1895.

PRACTICAL sanitary legislation may be said to date from the passing of the Public Health Act, 1848, which was the fruit of the famous Health of Towns Commission, whose first report appeared in 1844. Although tardy in its start, it made rapid progress, and between 1844 and 1875 more than seventy Acts of Parliament were passed dealing directly or indirectly with the subject. The confused and intricate state of the law under these circumstances may be imagined, and the feeling of relief was general when, in 1875, Parliament saw its way to consolidate the unwieldy mass of statutes by the Public Health Act, 1875, which, however, did not include the Metropolis within its scope. London in 1891, however, obtained a Public Health Act for itself, very similar in its details to the 1875 Act, but much improved in consequence of the experience obtained from the working of the earlier Act.

The current of sanitary legislation had, however, set in steadily and it became necessary in 1892, for brevity of reference, to pass the "Short Titles Act, which had the effect of including the Public Health Act, 1875, and thirteen subsequent enactments under the comprehensive title of "The Public Health Acts." Matters are now in much the same position as they were immediately preceding the consolidating Act of 1875. We are, therefore, glad to welcome Messrs. Angell and Morley's book, which affords a ready means of reference to a multitude of statutes bearing upon sanitary law, at the same time giving the essential bearing of the sections indicated. In order to render a work of this character useful it must be reliable and accurate in every detail. In fact, like a chain, it must be proved by its weakest link. We have carefully read and compared the work before us, and, avoiding hypercriticism we are pleased to say that it appears to stand this test. We feel sure that it will prove useful to the rapidly increasing number of those interested officially or otherwise in sanitary legislation, and, in view of the probable further consolidation of the legislation in the near future, when this book would become unnecessary, we think that the authors deserve cordial thanks for expending so much ability and labour upon a work, the life of which must of necessity be brief.

The Management of Dynamos. By G. W. LUMMIS-PATERSON. London: Crosby Lockwood & Son. 1895.

THIS book is for the use of mechanics and engineers who have charge of dynamos. It frequently happens, now that dynamo-electric machinery is used in so many works and for such varied purposes, that an apprentice has to undertake the charge of a dynamo without having had much previous experience. He probably gets on very well at first, but soon the dynamo needs some trifling repair, and when it is started again it refuses to excite itself. Finding out what is wrong severely tests the skill with which a young electrician can apply his knowledge. Such a book as this will be of great assistance in helping him; for example, the defects which may give rise to this failure to excite will be found carefully tabulated and the appropriate remedies described.

The first four chapters give an elementary theory of the dynamo; the next four the construction and action of the ordinary forms of dynamos; and in the last four hints are given for their practical management and working. The arrangement of the book is good, and considerable originality of treatment is shown in the latter part; but a short chapter on the management of alternating-current dynamos would have considerably added to its value.

Correspondence.

To the Editor of THE BUILDER.

ON COMMON COLOURS.

SIR,—I have just returned from abroad, and had my attention directed to Mr. Crace's letter criticising my article. May I begin by saying that it was not my object to recommend any particular pigment to the notice of house-painters, and that I was at some trouble to avoid appearing to do so. I have conducted many experiments on various whites, and have published the results in the *Journal* of the Society of Arts. I am conducting experiments at the present time, and hope to make the results known through the usual scientific channels.

All this is quite apart from the object of my article, which was to direct attention to the importance of systematic scientific research, and scientific instruction in connextion with house-painting.

Mr. Crace's remarks about dyeing and about the unsatisfactory results of applying to the analytical chemist, are confirmations of the view I have taken up.

I did not, in referring to dyeing, mean the discovery of the coal-tar dyes, but wished to direct attention to the results of establishing scientific technical laboratories in this subject. By the researches carried on in the dyeing laboratory of Yorkshire College, Leeds, and elsewhere, the new dyes have been classified as to their properties and durability, and it has been found that by careful selection a far more permanent list of dyes, leading to much greater variety of colour, can be obtained by the modern dyer than could be obtained in the past.

The result, therefore, of careful study in a laboratory with no commercial bias has been to improve the art of dyeing at a time when it might have sunk into unutterable confusion owing to the discovery of so many new dyes.

Now the art of the house-painter is threatened by the same danger, and these same aniline dyes are being used for the manufacture of new pigments, while on every side the ingenuity of modern chemistry is turning out new products which may, or may not, be ultimately found to be improvements. It is therefore of importance that the trade should meet the difficulties caused by the march of invention in the same way.

If Mr. Crace would like a practical suggestion, I should advise that the Painters' Company should go to one of the Polytechnics, either in East or South-East London, and undertake to endow a School of the Chemistry of Pigments, in which not only teaching should be given, of a simple kind suitable for painters, but also systematic research should be carried on into the whole subject, and the information obtained published from time to time in a form accessible to the trade. Such a department would not cost very much to endow, as these Polytechnics already have their chemical laboratories, and in one or two cases are already providing lectures on oils and pigments.

I have found from my own experience that if lectures on this subject are not made too difficult there is no trouble in persuading working house-painters to attend them and benefit by them.

I hope I have sufficiently explained my position. I do not desire to give tips through the columns of your paper, but I am anxious to press upon the painting world the necessity of a proper school for the study of the science of pigments and painting.

A. P. LAURIE, M.A., D.SC.

EAST LONDON WATER SUPPLIES.

SIR,—In reference to a Note in the *Builder* of the 7th inst., on the failure of the East London Water Supplies, I may mention that the last great frost was found to have been the cause of the defective action of the water-pipes to a house in Edinburgh: after the thaw began a considerable leakage and flooding took place into the street cellars used for coal, wood, cases, &c., accompanied with a reddish exudation.

The nuisance was reported to the Water Office, but they declined to take notice, and said it was only surface drainage. By and by, however, other complaints were made in the same street, which induced the Company to excavate and examine their main-pipes there. These were found all decayed, rotten, and covered with red exudation and incrustation inside and outside, and fractured easily with the blow of a mallet. They had been laid down many years since, and were also too superficial and of too small calibre, and no wonder they cracked and leaked after the great frost and thaw of the last winter.

Fresh main-pipes were, therefore, laid down and placed deeper in the street and of larger dimensions, and since then the external leakage into the cellars has disappeared.

As iron pipes evidently were seen to decay much more rapidly than the lead pipes jointed to them,

it is highly probable that in London the main-pipes in the street will be found to be more blameworthy for any leakage than the connected house-pipes. It was further seen that the lead pipes were generally free from incrustation or erosion in the soil of the street, while the iron pipes of any age were eaten away, and covered with the relics of decomposition, both inside and outside. This incrustation may probably have as much weakening influence on the shell of the pipe as the incrustation inside a steam-boiler has upon the strength of its shell when subjected to pressure. Iron water-pipes in the streets would also, therefore, require to be renewed throughout after the lapse of a certain period of years.

"OBSERVER."

ORNAMENTAL PARGETTING.

SIR,—I should be much obliged if any of your readers could give me information as to how ornamental pargetting is produced—such as one sees on the exterior of houses, &c., in many parts of the country

The ornamentation has apparently been stamped on these, and what I want to know is, how I can obtain the stamps and how to use them. I take it that the work could be done by ordinary plasterers after a little practice.

IGNORAMUS.

The Student's Column.

METALS USED IN BUILDING.—XI.

THE scope of the present series precludes the possibility of our describing in detail the principal non-metals, but in order to fully appreciate the composition and metallurgical effects produced in making alloys it is essential that certain non-metallic substances shall be briefly glanced at. That is the object of this article.

Oxygen.—This element enters into the composition of a vast number of metals and alloys. When substances combine with it they are said to be oxidised; on the other hand, substances which abstract oxygen from a compound are called reducing agents. Oxygen forms the active medium in which bodies burn, and in that sense is the prime supporter of combustion. Oxides are either acid or basic, the former are principally due to combination with non-metals, as in the case of silica or carbonic acid; and the latter chiefly arise from union with the metals. These two kinds when united in equivalent amounts generally have the effect of neutralising each other. A substance may be partially or wholly oxidised, depending on whether the change is complete or not. The particular stage in the oxidation of an ore has material influence on the method of dealing with its reduction or its union with another metal. Oxygen compounds are mostly solid or liquid, but in air this element is in the form of gas. It combines directly with many metals, and some, such as sodium, are compelled to be protected from it, so strong is the affinity between them.

Carbon.—This occurs in three different ways in nature:—(1) in the free state and crystalline, as diamond; (2) scaly, or lumpy, as plumbago and graphite; and (3) powdery or amorphous, as lamp-black and charcoal. *Graphite*, or black-lead, is almost pure carbon, but usually has about five per cent of impurities in the form of clay and iron. It is found in beds, lenticular and irregular masses in limestones, schist, gneiss, &c. Its numerous applications in the building arts are too well known to need description. *Coal* is a more or less pure form of carbon, depending on its variety and quality. *Bitumen* is essentially a hydro-carbon, and may occur in either the solid or liquid state. *Asphaltum* is a mixture of divers hydro-carbons, all more or less approximating to coal. It is found in large quantity in the well-known pitch-lake of Trinidad; the rock-asphalte of Seyssel and Neufchatel is a limestone impregnated with from 10 to 14 per cent. of bitumen.

Carbon has so great an affinity for iron that technically-produced iron invariably contains it, though the actual quantity may be infinitesimal. In order to unite the two it is not essential that the iron shall be in a fluid state; that may be accomplished by heating the iron for a sufficiently long period of time in a medium of carbon. The general effect of carbon in iron is, within limits, to increase the tenacity and decrease the ductility; also to cause the metal when suddenly cooled (under certain circumstances) to harden, the hardening being in proportion to the rate of cooling and the amount of carbon present. The maximum quantity of carbon which iron is capable of taking up in the blast furnace, in the absence of manganese, is about 4½ per cent. Much carbon renders the pig more or less scaly in fracture, and the metal then possesses but very little tenacity; as the amount of carbon is decreased, the grain of the iron becomes finer, its colour lighter, and its tenacity greater, but its fluidity when molten is less. Carbon tends to separate in a more or less mechanical, or graphitic form in pig-iron when that metal is heated much above its fusing-point, whereas the same mixture at a lower temperature (though above the fusing-point) would, on cooling, contain it in the combined state.

Carbon, in itself, is such an infusible substance that in the graphitic state it is largely adopted in the manufacture of crucibles; further, it has no tendency to ally itself with substances so as to form fusible slags in the crucible. It may be burned in contact with air. Carbonic acid is a gas which may be produced when carbon is burned in a plentiful supply of air, or in pure oxygen.

Silicon.—This never occurs in a free state in Nature; it is always combined with some other substance, and is largely responsible for the production of acid rocks. Its only known oxide is silica, which occurs in both crystalline and non-crystalline states. This oxide readily combines chemically with different bases, and gives rise to an enormous number of minerals termed silicates, in which are included several valuable ores. Silica plays a prominent part in the reduction of metals from their ores, it being the chief slag-forming substance. The quantity of silicon reduced in a blast-furnace depends on the nature of the flux and on the temperature. The higher the proportion of silica in the cinder the more opportunity is there for reducing, but even from very basic cinders part of the silica is reduced. In combination with iron silicon produces what is known as red-shortness and cold-shortness, and the quantity which may be present, without any decided effect resulting, depends largely on the relative proportion of carbon in the iron. Professor Bloxam has remarked* that, with the carbon at ·10 per cent., silicon might be present to the extent of ·50 or more without causing the metal to be brittle, whereas with about ·50 per cent. of carbon the same amount of silicon would cause the metal to be very red- and cold-short. Metal containing much silicon cannot be coated with tin owing to the former becoming oxidised during the operation and forming a protective coating of silica, which prevents the tin from adhering. From the foregoing it will be readily comprehended that under certain circumstances silicon is a very objectionable constituent of steel, yet in the production of sound castings it has proved itself a valuable ally. In combination with copper and tin it forms silicon-bronze, which is applicable for telegraph purposes, and it yields a valuable alloy also with copper alone.

Phosphorus.—The reduction of phosphorus from its compounds is a very easy matter. It is a waxy-looking substance which readily melts and passes off into vapour. Phosphates are decomposed by silica at high temperatures, and in iron it tends to produce cold-shortness. Phosphorus hardens iron to a greater extent than carbon, and, like silicon, the amount of it which may be beneficially used in iron is dependent on the proportion of carbon present. It is objectionable even in very minute quantities in steel for tool-making or cutlery, as the metal can then only be tempered with extreme difficulty; on the other hand, a small proportion is very useful for casting purposes, as the castings are thereby rendered sounder and sharper than would otherwise be the case. This element is an essential constituent of phosphor-bronze, as the latter name implies. Its principal function in that connexion is in refining the bronze rather than to form an alloy with the copper and tin. The physical properties of bronze are also improved by the addition of a little phosphorus. With copper alone it increases the hardness and fusibility of the metal. When present in small quantity it promotes the soundness of castings; though much of it causes the resultant alloy to be brittle. With tin it constitutes the metal known as phosphor-tin.

Sulphur.—This is not a very desirable constituent of most metals, especially certain kinds of steel. It occurs both native and in combination with many metals, forming sulphides; also in the gaseous and liquid states. Its principal home is in the divers volcanic regions of the earth, but much of the sulphur of commerce is procured from the almost universally-diffused copper and iron-pyrites, and from other sources. It is not soluble either in water or alcohol. Sulphur does not produce brittleness in steel, it is objectionable primarily on the ground of its impairing the soundness of castings. Few kinds of steel contain more than ·05 per cent. of sulphur, but even ·1 per cent. may be tolerated provided a fair proportion of manganese be present also. Mr. A. Vosmaer states* that, whereas ·04 per cent. sulphur renders wrought-iron completely useless, as much as ·1 per cent. may be present in steel without interfering with the rolling property, this difference being due to the fact that the former is practically free from manganese, whilst the latter invariably contains that metal. To the same cause may be attributed the property of hard steels to withstand more sulphur than mild ones. But sulphur increases the tendency of steel to rust. The only case where a real sulphide of iron is made use of is in the manufacture of certain cast-iron guns, and that sparingly. In all other cases, so far as iron is concerned, sulphur may be "considered as an impurity whose presence is a necessary evil."

Hydrogen does not generally unite with metals to form compounds, but iron and palladium, amongst others, absorb it in considerable quantities.

Nitrogen's prime function in the present connexion is to modify the action of oxygen in the furnace, and in this sense it may be regarded as a nuisance. It neither burns nor supports combustion, passing through the furnace after having assisted to increase the amount of work done therein, without itself having produced any directly-useful results. Of course, this also is a "necessary evil."

Selenium somewhat resembles sulphur in its properties, but is nowhere found in large quantities. It burns in the air with a bright blue flame, and gives off a characteristic odour. In the native state it occurs in cavities and crevices in the lavas of Vesuvius and elsewhere. It is also found in combination with silver, lead, copper, &c.

Chlorine is an active chemical agent, and by combining with many different metals forms chlorides. Indirectly it is a powerful oxidiser.

Fluorine, when combined with calcium, forms fluor-spar, which possesses the remarkable property of liquefying earthy substances. It is deservedly in high reputation as a flux.

Boron does not occur native, but as boracic acid, borax, boracite, &c. Borax forms fusible compounds with silica, as well as with nearly all bases, and is extremely useful in uniting with metallic arsenides, oxides, and sulphides. It is practically indispensable in the examination of metals by means of the blow-pipe.

* "Metals," 1894, p. 18.

* "The Mechanical and other Properties of Iron and Steel." 1891, p. 107.

GENERAL BUILDING NEWS.

THE RESTORATION OF OLD MAR CASTLE, BRAEMAR.—Mr. A. Marshall Mackenzie, A.R.S.A., architect, Aberdeen, has been commissioned by Mr. Farquharson, of Invercauld, to attend to the work of restoration of the interesting and picturesque old castle of Mar, Upper Deeside. Operations will be commenced at an early date, with a view to the castle being rendered habitable and let along with the salmon-fishings on the Dee next autumn. The Jacobite rising of 1715 was projected in the old castle, and near it was raised the standard of rebellion by the Earl of Mar, as commemorated in a well-known Jacobite song. It is understood that no change will be made on the exterior of the building, which is a prominent and admired object in the valley of the Dee.

ST. CUTHBERT'S COLLEGE, WORKSOP. — On Wednesday last week the dedication took place, by the Lord Bishop of Southwell, of St. Cuthbert's College, Worksop. The site of 100 acres on Sparken Hill, about a mile from the old town of Worksop, was given by the Duke of Newcastle, who, five years ago, laid the foundation-stone. The buildings form the western portion of what will eventually be a large closed quadrangle. The collegiate system will be followed at St. Cuthbert's. The internal measurement of the quadrangle will be 170 ft. square, and to it entrance will be gained through the arched gateway, with its porter's lodge, in the middle of the southern side. On the opposite side of the quadrangle will stand the great schoolroom, connected by a range of cloisters with the eastern and western sides. These will contain dormitories for the full complement of 400 boys, with libraries, class-rooms, studies, and all the other necessaries. To the east will project the chapel. The dining-hall has been already raised. It contains a range of offices, kitchens, buttery, larder, &c., projects towards the west, and is reached through an ante-hall. Like all parts of the college, it is a brick structure, with its mullions and lintels in stone. Internally, it possesses a hammer-beam roof. It is lighted by fourteen wide windows along the southern side, and seven others in the west wall. Externally, these latter appear above a range of five buttresses, and

the former are divided in seven bays with three high-pitched gables, by deep and gabled buttresses. The architects are Messrs. Carpenter & Ingelow. At present the dining-hall, the offices, the west wing, and a portion of the south wing are all that are completed. An illustration of the southern front of the quadrangle and of the southern side of the dining hall appeared in our issue for January 30, 1892.

BOARD SCHOOL, MORLEY, YORKS.—The corner-stones in connexion with the new Board schools in Bridge-street, Morley, were laid on the 7th inst., by Councillor C. Scarth. The schools are being built from plans prepared by Messrs. Holton & Fox, Dewsbury. They are designed on the central hall principle, and consist of a mixed school for 688 boys and girls, and an infants' school for 550 scholars. The total cost of the schools, not including the site, will be about 8,000*l.*

RESTORATION OF TOWER, BONVILSTON CHURCH, GLAMORGANSHIRE.—The tower of Bonvilston Church has been taken in hand and the work of restoration has been commenced. The peal of bells will also be re-hung. The work of restoration, &c., has been entrusted to Mr. Charles B. Fowler, architect, of Cardiff, the contractor being Mr. W. A. James, of Cowbridge.

NEW SCHOOL, GOSPEL OAK, TIPTON.—On the 4th inst. seven memorial stones were laid in connexion with the Wesleyan Chapel at Gospel Oak, Tipton. The building will accommodate 275 children. Messrs. Whitehouse Bros., Princes End, are the builders. Mr. Edward Pincher, of West Bromwich, is the architect.

MISSION HALL, PERSHORE, WORCESTERSHIRE. —The foundation-stone has just been laid of a Mission Hall at Pershore. Plans were prepared by Mr. W. Lunn, architect, of Malvern, and the contractors are Messrs. Nicholas Brothers, of Pershore. The mission buildings will consist of a main hall, 50 ft. by 24 ft., with an apse at the south end which will form a kind of chancel, and will be screened off; while there will be also provided a class-room and a scullery.

THEATRE ROYAL, GLASGOW. — The Theatre Royal, Glasgow, which, six months ago, was all but totally destroyed by fire, has just been rebuilt and reopened. In the main the former arrangement of the house has been followed in the new building. On the ground-floor there are the stalls and pit; the dress circle and the family circle occupy the first floor; and the second and third floors are respectively the upper circle and gallery. A few of the principal changes on the former theatre are:—The lowering of the roof of the auditorium by some 15 ft. or 16 ft., the lessening of the depth of the stage by 10 ft., and the addition of that space to the floorage of the pit, the insertion of two proscenium walls between the stage and the auditorium, and the widening of the proscenium itself. Special provision is made to prevent the spread of fire. The two proscenium walls are separated by a space of 10 ft., and the roofs of the auditorium and the stage are completely dissevered. In front of the stage also a fire-resisting curtain has been fitted up. In addition to this, water from the mains is laid with hydrants on to every floor of the theatre and the stage. The iron curtain can be lowered in little over half a minute, and is worked by hydraulic power. The stage is 42 ft. in depth, by 72 ft. in width. It is also constructed with every mechanical contrivance, and no gas has been laid on to any part. On either side of the proscenium there are three stage-boxes—one on the stalls level, one on the dress circle level, and another on the upper circle level—flanked by solid Corinthian pillars, which bear an arch spanning the proscenium. A gilded frame encloses the stage opening, and in the tympanum of the arch is a decorative painting by Mr. Ballard, London, representing Apollo and the Muses. Springing from the gallery floor on each side of the theatre is a series of groins extending to the top of the building. The ceiling itself is a circle surrounded by a decorated cornice divided into eight raised ornamental panels. The ceiling, and also the box fronts and proscenium, are made of fibrous plaster by Messrs. Jackson & Sons, of London. The general scheme of colouring is white and gold for the structural parts, and cherry-coloured plush for the hangings and arm rests; while the seats are covered with greenish peacock blue. For the back walls the colour adopted is a warm terra-cotta. In the disposition of the accommodation in the auditorium the formerly-existing arrangement has been adhered to. The stalls are, as before, in seven rows, aggregating 170 chairs, and the space of 10 ft. taken from the stage is added to the pit, where a departure is made by the provision of cushioned seats. The dress-circle accommodates 166 persons, and the family-circle 158; and in the upper circle about 400 persons can be seated. The back wall of the circle is arranged in a series of arcades filled in with glass, so that people standing in the corridor may see the stage without going into the auditorium. The pit is seated for about 1,000, and the gallery for about 800. Altogether the theatre will give accommodation to nearly 3,000 people. The crush-rooms, bars, and offices, which were not destroyed by the fire, have been redecorated and refurnished. The lighting of the building is mainly by electricity. Mr. F. C. Phipps, of London, was the architect. The following are the names of the various firms who have been associated with the construction of the theatre:—Morrison & Mason, Glasgow, general contractors; James Morrison, carpenter and joiner; R. A. M'Gilvry, plasterer; John Orr & Sons, painters; William Anderson, plumber and gasfitter; W. Meikle & Sons, glaziers; Edward Bell, of London, painting, decorating, and gilding; James Coombe & Son, of Glasgow, heating and warming; Strode & Co., sunlight; Claude Hamilton (Limited), of Glasgow, electric lighting; E. & E. Taylor, of London, fire-resisting curtain. Mr. Andrew Cavers has been clerk of works.

BUSINESS PREMISES, SHEFFIELD.—New premises have been erected by Mr. G. H. Hovey at the corner of Angel-street and Castle-street, Sheffield. The new premises have a frontage of 62 ft. to Angel-street and 40 ft. to Castle-street, and they comprise three sets of shops. The building is of brick, with ashlar stone-dressings, and above the fourth floor is a large turret, facing Snig Hill. The building has been erected from the plans and under the superintendence of Messrs. Flockton & Gibbs, architects, Sheffield.

COURT HOUSE EXTENSIONS, SHEFFIELD.—The old Town Hall or Court House, Sheffield, which stands at the corner of Castle-street and Waingate, is now being enlarged. In a short report prepared some months since, Messrs. Flockton & Gibbs, the architects, stated that the new building provides for an additional court 53 ft. by 33 ft., about the same size as the existing large court, and similarly arranged and furnished in oak; having a large corridor for waiting witnesses, a solicitors' room, and a room for consultation, all on the ground floor, and entered from the far end of the existing ground floor hall. Additional offices will also be provided for the stipendiary magistrates and the magistrates' clerk, and a large room, about the same size as the present grand jury room, will be provided for the magistrates. The magistrates' entrance is to be enlarged and made more important, and will have a suitable entrance-hall and an improved staircase. Under the court there will be twenty lock-up cells for prisoners, and two large cells for prisoners awaiting trial, all in easy communication with the existing and the new courts. A covered van-way passing under the court, and through the building from Waingate to Castle Green, will admit of prisoners being removed from the cells to the prison-van in privacy. The caretaker's house will be in Waingate, with communication to all parts of the building. The ventilating arrangements for the new building provide 3,000 cubic feet of fresh air for each person per hour. The place will be heated by hot-water pipes in the basement, mixed with cold air to the required temperature, and driven by a fan into the court and other rooms. The foul air will be drawn out by another fan. With respect to the cells, the only improvement on the old ones is the substitution of glazed brick surface for white-washed walls. The architects estimate the cost of the new buildings at 17,000*l.*, and the Watch Committee recommended the acceptance of a tender amounting to 15,684*l.*, including building, heating, and lighting, and all the permanent fittings. Access to the new court will be up a short flight of stairs at the further end of the hall. At the top of the steps will be a wide corridor with accommodation for waiting witnesses on one side, and solicitors' and other rooms on the opposite side. In the new court will be space for the general public, not only in the well of the court, but in the galleries round the room. The walls of the new court will be covered with a blue stone dado, with ornamental blue stone pediments and plaster cornices. The fittings, both in the court, in the various rooms, and in the large corridor leading to the court, will be of oak. In the large hall there will also be marble columns, and a mosaic floor is to be laid. Ashlar stone is being used.

CARDIFF FREE LIBRARY EXTENSIONS. — The rooms of the Cardiff Free Library extension, though sufficiently complete to allow of some of the meetings of the Libraries' Association being held in them this week, are not entirely finished, and the formal opening of the building has been delayed for a short time. The external portion is, however, practically completed, except as to the Working-street front of the old building, which replaces the former front, thus widening the street some 14 ft. The façade of the building in the Hayes contains a colonnade of columns in Portland stone on the first floor, or reference library story. On Saturday last week two seated colossal female figures, flanking the chief entrance in Trinity-street, were unveiled, and in reference to these, Mr. Edwin Seward, the architect, writes that the sculptural and carved work of the buildings has been executed by Mr. William Taylor, representing Mr. W. Clarke, sculptor, of Llandaff. The figures referred to are in single blocks of Portland stone, and they are about one-fourth over life-size. They represent on the left Study, on the right Rhetoric. Above the arched entrance to the building, a new rendering of the heraldry of the Cardiff coat of arms has been carved, the shield being surmounted by the mural coronet, mantled with oak and laurel, and flanked by the maces, which are exactly reproduced from the silver maces belonging to the town of Cardiff. There are two small figures on either hand—the one a reader, and the other a scrivener—which, with flaming braziers, typify Literature and Learning; also emblematised in the arch below by a lamp and torches flanking an open book, in front of which is the Mirror of Truth. In various places in the fronts a feature of some interest has been introduced in the carving—viz., a series of representations of the early marks of the great European printers. Many of these have been supplied from a collection of early specimens of printing and printers' marks formed several years ago by the architect. The series commences with the devices of William Caxton, the first English printer, and his successor, Wynkyn de Worde, on the left and right of the chief entrance respectively. Between these are the serpent and olive branch of Robert Estienne, of Paris, and the Pegasus of Andre Wechel. Further on is the globe of the Elzevirs, of Amsterdam and Leyden, and on the angle towards Wharton-street the twin shields and monograms of Fust and Schoeffer (with Gutenberg), the first printers. In the Hayes front are the Aldine anchor and dolphin of Venice; the hand and compasses of Christopher Plantin, of Antwerp, and on the Working-street angle the Adam and Eve of Phillipe de Giunta, of Florence. Elsewhere appear the marks of Thomas Vautrollier, Richard Pynson, and John Day. Places have been reserved in the incomplete portion of the Working-street front for the marks of two Welshmen printers—Richard Johnes and another. Most of the carvings above described are in white Portland-stone, but yellow Ham-stone has also been used in places, whilst the whole of the fronts are, otherwise, of Bath-stone from the Combe Down Quarries. The Hayes front is crowned by a colossal bust of Minerva, as goddess of the Arts and Sciences, with the owls as her attributes on either hand. On the pedestal under the bust is an open book. A large tympanun of semicircular shape in the centre of the front contains a bas-relief group, emblematising Literature, the seated female figure of Literature holding a lighted torch, with two Cupidon figures, one inscribing a scroll, and representing Caligraphy with the hour-glass of Time, and the other representing printing by using a pad on a type-frame, and near it the beehive of industry.

CHURCH, YSTRAD RHONDDA.—The corner-stone of a new church for Ystrad Rhondda has just been laid. The church will accommodate 480, and the cost will be 3,500*l.* The plans, &c., have been prepared by Mr. E. M. Bruce Vaughan, Cardiff, and the contractors are Messrs. A. J. Howell & Co., Cardiff.

SCHOOLS, DUBLIN.—On the 10th inst. the Lord Mayor of Dublin opened the new schools in Aughrim-street. There are three large schoolrooms—one for girls, one for boys, and an infant school, and in addition there are class-rooms, &c. The cost of the building exceeds 4,000*l.* The architect was Mr. Walter G. Doolin, M.A.

WESLEYAN SUNDAY-SCHOOL, SCARBOROUGH.—On Tuesday the memorial-stones of the new Sunday-school to be built in connexion with the Westborough Wesleyan Chapel were laid. The building is situated at the rear of the present Wesleyan Chapel, Westborough, and fronts to Belle Vue Parade. It will consist of a central hall, 46 ft. by 46 ft., with galleries on three sides, three class-rooms, about 11 ft. by 13 ft. 6 in. each, a young men's room, 24 ft. by 18 ft. 6 in., and a book store on the ground floor, and five class-rooms on the first floor, one 19 ft. by 12 ft., and four about 11 ft. 6 in. by 13 ft. 6 in., which latter will be arranged so as to be thrown into the gallery when needed to add to the accommodation of the central hall. In the basement, lavatory accommodation for both sexes will be provided. The boys' entrance will be on the western and the girls' on the eastern side of the building. Each will have an outer lobby, and an inner lobby communicating with the northern end of the chapel; also staircases giving access to the first floor class-rooms, the gallery of the central hall, and the chapel galleries. There will be a third entrance in Belle Vue Parade communicating directly with the young men's room. The elevations will be of a character to harmonise with the chapel, and outside facings will be buff pressed bricks, with dressings of Cloughton stone. The centrall hall will have an open wood roof, ceiled at the collar-beam. The architect is Mr. William Watson, of Wakefield, and the contractors Messrs. Bastiman & Sons for the bricklayers', masons', and plasterers' trades; Mr. Joseph Hargreaves for slating; Mr. George Scales for carpenters' and joiners' work; Messrs. Thomas Craven & Son for plumbing and glazing; Messrs. Appleby & Brogden for ironwork; and Mr. Harry Jackson for painting; all of Scarborough. The contracts amount to 2,500*l.*

SCHOOLS, DROITWICH. — New schools at Winnett's-lane and at the Holloway, Droitwich, were opened on the 5th inst. by Lord Hampton. These schools have cost 2,600*l.*, with the alterations and additions to the old ones at the Holloway. The architect of the new schools at Winnett's-lane is Mr. Louis Sheppard. The schools are built of red brick and stone facings. The Winnett's-lane school will accommodate 184 infants, and the Holloway schools with the additions 245 boys, 230 girls, and 142 infants. The builders of the Winnett's-lane schools are Messrs. Smallwood, of Wootern Wawen, and of the Holloway, Messrs. Emuss & Harris, Droitwich.

SANITARY AND ENGINEERING NEWS.

SEWERAGE SCHEMES FOR CHESTER-LE-STREET RURAL DISTRICT COUNCIL.—At a meeting of this Council, held on the 5th inst., it was agreed to adopt the recommendation of the Sewerage Committees for two schemes of main sewerage and sewage disposal to be constructed forthwith, in order to meet the requirements of the Local Government Board and Durham County Council, per plans and estimates prepared by Mr. D. Balfour, M.Inst.C.E., of Newcastle-on-Tyne. The first scheme embraces the whole of the villages within the townships of Pelton, Ouston, and Urpeth, also the village of Chester Moor, and the remaining part of the town of Chester-le-Street, with an aggregate population of 19,500, and comprises 20½ miles of main sewers of 24 in., 21 in., 18 in., 15 in., 12 in., and 9 in. fireclay pipes and appurtenances, at a cost of 15,030*l.*; and for sewage disposal works by chemical precipitation and filtration, in conjunction with intermittent land filtration, at a cost of 5,500*l.* The second scheme embraces the whole of the villages within the townships of Washington and Usworth, also the village of Pattinsontown in Barneston township, and Eighton Banks in Lamesley township, as well as houses in a small portion of the town of Gateshead having the watershed to the river Wear, with an aggregate population of 12,500, and comprises 18¾ miles of fireclay pipe main sewers varying from 21 in. to 9 in. diameter, and appurtenances, at a cost of 13,000*l.* This amount includes outfall subsiding tanks.

SEWAGE OVERFLOW AT WESTMINSTER. — A deputation of tradesmen and residents of Rochester-row, Westminster, waited upon Mr. de Rutzen, at the Westminster Police Court, on the 9th inst., for his advice as to sewage overflows into the basements of their houses. One of the applicants, a coffee-house keeper, said that on the occasion of one recent storm he had 18 in. of sewage in his kitchens, and the stench was the direct cause of the death of one of his children. He had been obliged to send the remainder of his family away, and if nothing was done he did not see how he could continue to conduct his business. He and his neighbours had experienced no less than five inundations of sewage in a year and nine months.—Mr. de Rutzen referred the applicants to the sanitary inspector. If they got no satisfaction from him they could renew their complaint.—Further representation was made to Mr. de Rutzen by Rochester-row, Westminster, tradespeople as to the annoyance and injury to health from sewage overflows on the occasion of severe storms. A complainant said that the Sanitary Inspector came to his house and had a look round, and the process had been repeated by the Chairman of the Sanitary Committee and the Foreman of Sewers. Nothing, however, in the way of remedy had been attempted. —Mr. de Rutzen said he had already suggested an urgent appeal to the sanitary authorities, and he would send one of the warrant officers to the Vestry Office to state that he was perfectly sure that everything possible would be done to minimise a nuisance of so very serious a nature.

SEWAGE SCHEME, GREAT AYTON, YORKSHIRE. —The Parochial Committee of Great Ayton have awarded the first premium to Mr. Harry W. Taylor, C.E., of Newburn, for his Sewage Disposal scheme, embracing the Universal system (the "Ives" patents), and a loan to carry out the work is to be applied for.

SANITATION AT QUARRY BANK, STAFFORDSHIRE. — A meeting of the Quarry Bank District Council was held on the 10th inst., when Mr. Billingham drew attention to the severe epidemic of typhoid fever, and asked if summonses had been issued against persons who had not closed condemned wells. Mr. Sidaway (Inspector of Nuisances) said the wells had not yet been closed. It lay with the Clerk to summon persons. The Chairman told the Inspector that the orders of the Council were to be enforced and summonses issued. Mr. Smith drew attention to an open sewer between Quarry Bank and Birch Coppice, where the sewage of a great part of the district was carried. A Member: It is nothing more nor less than a death-trap. It was unanimously decided to place pipes in it from top to bottom. The Medical Officer reported a death-rate of 20·57 per 1,000, compared with 18·85 last year. During the month 68 cases of infectious diseases had been notified, viz., 29 fresh cases of typhoid fever, 38 scarlet fever, and one erysipelas. He had made an inspection of the whole of Sheffield-street, and especially with respect to the water supply. He considered that the wells in the district were quite unfit for domestic use. Twelve samples of water had been analysed, and in every case he found the water unfit for drinking. In one instance a cesspool, after rain, emptied itself into the well, and people had to cover up their faces to avoid the sickening effluvia from it. Ashpits he found contaminated with typhoid poison, uncovered, and full of liquid manure. The smell in many cases was simply awful, whilst he also found a well with a tub of pig-swill three yards from it, and no doubt when there was rain this swill washed into the well. In Vine-street he found wells contaminated with organic matter, and these should be closed. There had been fourteen cases of infectious diseases in the hospital, and two patients had died there. The others were recovering. A well near where the first case of typhoid fever was discovered contained water that was unfit for use. The report was adopted.

WHARF PIER, PLYMOUTH.—The Phœnix Wharf Pier, built on the western shore of the Cattewater, Plymouth, was opened on the 10th inst. by the Mayor of Plymouth (Mr. W. Law). Built of concrete blocks, the structure is 70 ft. long by 45 ft. wide, with a wooden platform projecting beyond the masonry and supported on iron columns. On either side is a long flight of steps, also resting on iron columns. Both these landing-places are carried out into deep water, enabling passengers to land at all states of the tide. The pier is approached from Commercial-road by means of a flight of steps and a gangway, 8 ft. wide, extending a distance of 110 ft., as it is intended chiefly for steamer-traffic. The work has been carried out by Mr. George Shellabear, from the designs of Mr. G. D. Bellamy, Consulting Engineer to the Corporation, and under the supervision of Mr. C. Winnicott, clerk of works.

FOREIGN AND COLONIAL.

FRANCE.—It is announced that the Sultan has promised a contribution of 500,000 francs towards the cost of the new mosque which is to be built in Paris from the designs of M. Saladin.——A new street, which will bear the name of "Square de l'Opéra," is to be formed in Paris on the site of the Eden Theatre, which has just been demolished. It will connect with the Boulevard des Capucines.——M. Moreau, the architect, has nearly completed the new abattoir which has been in progress on the left bank of the Seine, to replace the abattoirs of Villejuif and Gravelle. The cost of this great undertaking will probably amount to 12,800,000 francs.——A new church is shortly to be built at Clichy, to replace the old one, which dated from 1612, and with which St. Vincent de Paul was connected.——The work of restoration is to be commenced next month at the church of Bougival, an important monument, the nave of which dates from the thirteenth century; the bell-tower being still older. Nearly 600,000 francs is to be spent on the work.——The exhibition organised by the Société des Amis des Arts at Aix, in Provence, is to be opened on November 3, to close on the 29th of the same month.——An International Exhibition of Arts and Industries is being organised at Poitiers for the present month. It is held in the Blossac Park. ——In the process of demolition of the fortifications at Arras an old tower has been discovered of the date of the tenth century, in which, according to a tradition, Jeanne d'Arc was confined in 1430.——The town of Toulouse is about to construct a new bridge over the Garonne at Portet.——It is announced that a statue of Gambetta is shortly to be erected at Bordeaux, on the spot formerly occupied by a statue of Napoléon III. In the same city the monument to President Carnot will in a few weeks be erected on the Place Richelieu.——A new hospital is to be erected at Rodez, at a cost of 300,000 francs.——An asylum for convalescents is to be erected at Havre, through the liberality of M. Kerdyeck, a wealthy merchant of that town.——The death is announced, at the age of twenty-six, of M. Alphonse Pascal Estienne, painter, and also director of the magazine entitled *L'Europe Artiste.*

AUSTRIA. — The Austrian Budget for 1896, which has now been published, gives the professors and tutors of the technical colleges cause for complaint. Whilst there has been some improvement in the salaries of the lower grades of the Government servants, the members of the learned professions have not been thought of. There is plenty of room for improvement in engineering and architecture throughout Austria, and one of the ways towards progress will be the retention of first-class masters in the technical institutions.——It has been decided to hold a large agricultural exhibition at Vienna next year. There will be a section for models and plans of architectural buildings, model dairies, &c., and also for hop-kilns, breweries, &c.——The Hungarian Government has decided to construct a winter harbour at Pressburg, on the River Danube. The plans of the new works show that the harbour will have accommodation for eighty tug-boats of 400 tons each. There will be unloading quarries with warehouses, &c., and the preliminary vote already passed figures at 40,000*l.*——We regret to announce the death of Herr Karl Kayser at the age of fifty-eight. Herr Kayser, who was a well-known figure in the Austrian Art circles, acted as Court Architect to the Emperor Maximilian of Mexico from 1864 to 1867, and was engaged on various restorations, and some palaces in that country. On his return to Vienna he held a number of important commissions for town houses, and mansions for the Austrian aristocracy, and also restored many of the historical country seats in the country.——We also regret to record the death of Herr E. Kaiser, the painter, who died at the age of seventy-five. Herr Kaiser was well known in this country, and held commissions, if we remember rightly, for the Arundel Society to copy works of old masters.——The plans of the new central station for the proposed Metropolitan railway at Vienna are now on view at the Town Hall. The lines run in a cutting, and the station will hence also be below the street level. The site is near the Central Customs Station, and the approaches have been very carefully thought out.——A new pumping-station for the waterworks is to be erected at Vienna at a cost of 25,000*l.*, owing to the insufficiency of the water supply in the higher districts of the city.

AUSTRIAN LIGHT RAILWAYS. — The Vienna *Freie Presse* publishes some interesting particulars as to the progress of light railways in Austria. The Austrian Parliament sanctioned forty-seven new lines during the last two sessions, and in most cases the authorisation was quickly followed by the commencement of the works in question. There are also some twelve light railways in course of construction for which concessions were obtained at an earlier date. It would lead too far to name the various lines sanctioned, with their cost, &c., but on looking through the lists we find that twenty of these lines are being constructed in Bohemia, and that the average cost of the lines is 200,000*l.*, and that the average length is about fifteen English miles.

MISCELLANEOUS.

WOOD VERSUS ASPHALTE PAVEMENTS.—Like the neighbouring parish of Marylebone, the St. Pancras Vestry are substituting wood for granite setts and macadam in remaking the roads under their control, and most of the leading thoroughfares in St. Pancras have now been paved with wood. The hard and non-absorbent woods are now being mainly used. A proposal to pave Francis-street, Tottenham Court-road, with asphalte instead of wood was almost unanimously rejected at the last meeting of the St. Pancras Vestry, Mr. Purchese, chairman of the Works Committee, remarking that it had been demonstrated that asphalted pavements were the most slippery and dangerous of all pavements, and it was positive cruelty to horses to use asphalte as road-paving material. Observations of the relative slipperiness of asphalte, granite, and wood had been made in the City during fifty consecutive days at the instance of the City Engineer. During those fifty days 1,066 accidents occurred on asphalte, 719 on granite, and 542 on wood pavement.

YORKSHIRE ARCHÆOLOGICAL SOCIETY.—About sixty members of this Society met on the 6th inst. at Nunnington, about four miles from Helmsley. The first visit was made to the church, which has a history connected with that Earl of Morton who was a brother of William the Conqueror, and by whom it probably was founded. There is a very curious tablet in the church to Thomas Jackson, a famous jockey of last century, and which says none, however humble of birth, need despair of glory, such as the said Thomas won at Newmarket. From Nunnington, waggonettes took the party to Stonegrave, where Mr. Bilson described the church, with its beautiful screen of the time of Laud, 1637. This is one of the very few in the county which escaped destruction, for strict orders came from Parliament that all were to be destroyed. Canon Greenwell then described the ancient cross in the church, which he dated about the tenth century, and which he said was no doubt a memorial-cross to someone. From thence a short visit was paid to Oswaldkirk, and then the party drove off to Gilling Castle, which has lately been sold by the Fairfax-Cholmleys to Mr. Wilson, ex-Lord Mayor of York. The dining-room of the castle was described as the most beautiful Elizabethan room in existence, owing to the stained glass that it contains. The day's excursion was under the direction of Mr. Brown, the Secretary of the Society.—*Leeds Mercury.*

MEMORIAL OBELISKS, HAWICK.—On the 7th inst., at the site of Henlawshiel, on the Cavers estate, a few miles from Hawick, a granite obelisk, marking the spot whereon stood the cottage inhabited by the parents of Dr. John Leyden, poet and Oriental scholar, was unveiled at Denholm. On the same day a tablet in the wall of the cottage where Leyden was born was uncovered. The sculpture work was executed by Mr. Robert Robson, of Hawick.

TRADE NOTICE.—Mr. A. G. Wright, formerly an ironfounder at Rotherham, and who has been connected with Geo. Wright & Co. and Geo. Wright & Sons, and other London firms, has opened an office at 53, Victoria-street, Westminster, as an engineer and ironfounder.

HADRIAN'S WALL.—The excavations promoted by the Cumberland and Westmoreland Archæological Society, along the line of Hadrian's Wall, have just come to an end. One very important and interesting discovery has been made at Appletree, about a mile west of the Roman fort of Birdoswald (Amboglanna). It has long been observed that at this spot a deep fosse interposes itself for nearly a mile between the Wall and the Vallum, running roughly parallel to these two works, but finally running into the Wall about a mile and a half from Birdoswald. No one has professed to explain the existence of this fosse. Usually it has been held to be a "first shot" for the line of the Wall, afterwards altered. It has now been made certain that this fosse is the ditch in front of a turf-wall, built, like the Vallum of Antoninus in Scotland, of regularly laid sods, and extending probably the whole length of the ditch. This is the first trace yet found of a turf-wall along the English Wall.

It remains to be seen whether the clue given at Appletree will result in the detection of further traces, or whether the Appletree turf-wall is an exception.

CARDIFF EXHIBITION, 1896.—As we have already stated, an Exhibition on a large scale is to be opened at Cardiff in 1896. The mining and engineering sections will be very prominent, says the *Western Mail*, though, of course, maritime industries will be well represented. Other sections of the Exhibition will embrace the latest developments in electricity, in scientific instruments, &c., whilst agriculture, horticulture, sports and pastimes will not be overlooked.

PENRHYN SLATES.—We hear that the newly-built steamer *Penrhyn*, designed specially for carrying slates from the Penrhyn Bangor Slate Quarries, left Port Penrhyn on the 1st inst., on her maiden voyage, consigned to the Slate Wharf in Bermondsey Wall, belonging to Messrs. Roberts, Adlard & Co., where she arrived on the 6th inst. The steamer has been constructed so as to facilitate loading and discharging, and carries an electric light installation in order to illuminate the wharf at which she delivers. The schooners previously employed often took from two to twelve weeks.—Mr. J. J. Etridge, jun., of Bethnal Green, has just received a cargo of Penrhyn slates by the *Penrhyn* steamship. The steamship unloaded her cargo of something like 250,000 slates, and started for home in less than one week.

ROYAL SOCIETY OF ANTIQUARIANS OF IRELAND.—A large number of the members of the Royal Society of Antiquarians of Ireland arrived in Ferns on Monday, and after viewing the antiquities proceeded to Wexford. Subsequently the fourth general meeting was held in the Town Hall, when there were over one hundred members of the Society present. The President, Mr. Thomas Drew, R.H.A., in opening the proceedings, said that unfortunately he had very little knowledge of the antiquities of Wexford locality, but he should congratulate his fellow members on having chosen historical Wexford as the county for their excursion this year. Wexford, no doubt, was full of archæological lore, and an exceedingly interesting place, of which they knew very little. For those who were not acquainted with the proceedings of their Society he might say that it was founded in Kilkenny forty years ago, but yet it was one of the most youthful Societies of the present day. He was glad to see that the Society was not looked upon as it was in old times, and that recently a new movement had sprung up in connexion with it, and that the ladies were taking an interest in their proceedings. The Municipalities had opened their records to them, and private gentlemen began to find that the records in their houses were valuable, and consequently a practically unlimited field was opened. He congratulated the members on the success of the Wexford excursion, in which nearly one hundred were taking part. They only had at present an outline of what Wexford afforded to antiquarians, and it only needed another excursion to enable them to be better informed. Rev. D. Murphy then delivered a lecture on Irish art, as exhibited in early Celtic crosses and other objects, illustrated by lantern views. On Tuesday some of the members of the society left Wexford by an early train in order to make a complete inspection of Rosslare Harbour, but the main body left the town at eleven o'clock, and after a short visit to the harbour, which is soon to become the Irish station for another cross-channel service, proceeded to several places of interest in the barony of Forth. The perfect and well-preserved rath at Ballytrent was first visited. Clougheast Castle, an old Norman keep, was also viewed, after which the party went to St. Vogue's, on the coast of Carn, facing the Tuskar Lighthouse, and partook of luncheon on the rocks. Lady's Island, with its lake and leaning castle and its Catholic church, well repaid the antiquarians for a stay of close on an hour, and then the party proceeded to Butlerstown Castle, one of the Norman forts of South Wexford, which is the seat of the Boxwell family. Killaine Castle, the residence of the Aylwards, was also viewed, and the party arrived in Wexford at about seven o'clock. The annual dinner of the society took place in White's Hotel, after which were submitted papers on "The Antiquity of the Ferns," by Mr. Philip Herbert Hore; "Ancient Churches of the Town of Wexford," by Mr. John B. Cullen; and "Wexford in the Stone Age," by the Rev. Mr. Ffrench.

SURVEYORSHIP APPOINTMENT.—Mr. Oliver E. Winter, Deputy City Engineer and Surveyor of Norwich, has been appointed Surveyor of St. George the Martyr, Southwark, in succession to Mr. A. M. Hiscocks, C.E., who retires on a pension.

GLASGOW ARCHÆOLOGICAL SOCIETY.—The annual excursion of the Glasgow Archæological Society took place on Tuesday. Over twenty members, most of whom went to Carlisle on Monday night, took advantage of the excursion. On Tuesday morning the party were met in the Tullie-house Museum by the Worshipful Chancellor Ferguson, who, in spite of the rain, conducted the party round the exterior and interior of the castle, showing first the external wall and subsequently the various inner works of the keep built by William Rufus. Thereafter the cathedral was visited, where the Chancellor and his brother, Mr. C. J. Ferguson, architect, gave a full account of the building, from the early Roman remains in the transept to the early English and fourteenth-century work of the choir, pointing out the many interesting features in the carved wood-work and the early paintings. The excursionists next visited Gilsland, where they were met by the Rev. A. H. Wright. They visited first a portion of the Roman Wall, showing from 3 to 4 ft. in height still standing, in the grounds of the Vicarage. Then taking carriages they drove to Birdoswald, the Roman station of Amboglanna. The walls, gates, and chambers and the interior of the buildings were all examined, and the altars were shown by Mr. Wright and Professor Pelham, of Oxford, who has superintended the making of several excavations in the neighbourhood. The journey was resumed along the line of the Roman Wall to the Priory of Lanercost, situated in the wooded valley of the Irthing. The Rev. H. Whitehead guided the party throughout, indicating his opinion that it had originally been an aisleless church of the early Norman type, built towards the end of the twelfth century, but subsequently enlarged into a single aisle building which remained little altered during the greater part of its effective existence as a priory. The final stage of the excursion was the brief passage from Lanercost to Naworth Castle, the home of the Dacres and the Howards, and the centre of innumerable Border martial memories. It is now the residence of the representative of the Howards, the Earl of Carlisle, who met the party, conducting them through the mansion. The company then drove from Naworth to Naworth Station, and took the train to Carlisle Station, where they dined in the Central Hotel. Mr. John Honeyman was in the chair, supported on his right and left by Chancellor Ferguson and Mr. C. J. Ferguson.

LEGAL.

E. CHARNOCK *v.* W. EAVES & CO.

AT the Blackpool County Court, on the 29th ult., the case of E. Charnock *v.* W. Eaves & Co. came before Judge Coventry. The plaintiff, a quarry-master of Halifax, sued William Eaves & Co., builders, Blackpool, to recover 28*l.* 19s. 3d., being the balance of an account for stones delivered by the plaintiff to the defendants, who were the contractors for the recent enlargement of the Blackpool Catholic Church, on which work the stones were required. Mr. C. W. Callis (Blackpool) represented the defendants, and Mr. E. Booth (Halifax) appeared for the plaintiff. The defendants had paid 18*l.* into court, and disputed the balance of the claim. The facts of the case, as stated by the plaintiff's solicitor, were that Charnock had a traveller named Marsden, who obtained an order from the defendants for a few trucks of pitch-faced wall stones, 6 in. on the bed, to be 4s. 9d. per super. yard. These stones were duly supplied. On July 10 the defendants wrote, "We shall require 600 super. yards of wall stones, including those you have already sent, so kindly let us have the remainder as soon as possible, and oblige." No complaint was made about the original consignments, and the additional order was carried out.

Mr. Callis observed that on July 12 defendants wrote to plaintiffs giving drawings of the stones he was sending and of those he should have sent.

Mr. Booth: Apparently there was no contract that the stones were to be subjected to the approval of any architect.

Mr. Callis: My point is, we ordered stones to be 6 in. on the bed. Those supplied only averaged 4 in., and had to be re-cut in consequence.

Mr. Booth: I have no intimation of any complaint being received, and the goods were retained, and are still retained, by defendants to this day. And that being so I submit that they have simply used the quantity they wanted, and those they have left—which are, of course, the worst, having put the best into the work—they want to return.

Mr. Callis: If you look at our letter of November 24 you will read: "You must at once remove the wall stones, which are condemned by the architects. . . . We have used as many as we can; all that we have are so bad we could not do anything with them. The architects would not have them put in."

Mr. Booth maintained that in the plaintiff's contract nothing was said about satisfying the architects.

Evidence having been given on both sides,

For the defence, Mr. Callis argued that his clients had acted very straightforwardly, and even generously, towards the plaintiff, and had given him every opportunity to remove the stones.

On the other hand, Mr. Booth submitted that there was no mention to the plaintiff that the stones were subject to the approval of the clerk of works, therefore the fact that he would not allow Mr. Eaves to use the stones was no reason why the plaintiff should not be paid.

The judge said the plaintiff accepted the order, and therefore undertook to supply wall-stones 6 in. on the bed, and he was of opinion that the contract had not been fulfilled. As to defendants entering no complaint about the first consignment, his honour said it was impossible for a contractor on a large undertaking to examine all the stones immediately, and the defective ones could only be discovered as the stones were coursed and overhauled. Through the non-fulfilment of the contract, the defendants had been put to additional expense. He thought that they had made out their case. Therefore the plaintiff would be sufficiently compensated with the amount paid into court, and he gave judgment for the defendants accordingly.

ALLEGED INTERFERENCE WITH ANCIENT LIGHTS IN A SCHOOL-HOUSE:

CASE IN THE VACATION COURT.

THE case of the Vicar and Churchwardens of St. Mary's, Spital-square, *v.* Chillingworth, on Tuesday last, came before Mr. Justice Mathew, sitting as Vacation Judge, it being an application by the plaintiffs for an injunction restraining the defendant, his servants and agents, until the trial of the action, from erecting or continuing the erection of a building which would interfere with certain ancient lights in the plaintiffs' premises.

Mr. Alexander, Q.C., who appeared with Mr. Martelli, for the plaintiffs, said that his clients were trustees of a trust deed, dated May 28, 1853, which was executed under the authority of two Acts of Parliament, passed in the present reign, for the endowment of the School of St. Mary, Spital-square, in the City of London, and by the deed a piece of land in Church-passage was conveyed to the trustees for the purpose of erecting a school for the parish. The school-house was erected in 1854, and there had been no alteration in the lights from that time to the present, so that there could be no question about their being ancient lights. The school-house contained seven ancient windows facing Church-passage.

Mr. Marten, Q.C., who appeared for the defendant, said that his client had had no opportunity of answering the affidavits filed on behalf of the plaintiffs, and as the defendant had built up his wall as high as he was going, he (Mr. Marten) suggested that the best course would be for the defendant to give an undertaking to "pull down" if required to do so at the trial.

Mr. Alexander said that the plaintiffs could not accept that. It was a most serious matter for the schools.

Mr. Marten remarked that he was anxious that there should not be any more expense than was absolutely necessary, and suggested that the best thing would be to refer the whole matter to some gentleman of high standing to say what should be done.

Mr. Alexander, in answer to his Lordship, said that nothing short of an injunction would satisfy the plaintiffs. It was in the affidavits that the school-house had never had too much light at the best of times. They expected a visit from Her Majesty's inspector in November, and he would shut up the schools to a certainty.

His Lordship said that he could not possibly dispose of the case, and suggested that the undertaking proposed to be given by Mr. Marten would be sufficient to guard the plaintiffs' interests.

Mr. Alexander: Your Lordship sees that the plaintiffs have a public duty to perform. There are over 400 children coming daily to the school.

His Lordship: How can you be in a better position than having the undertaking of responsible people, that, if you turn out to be right, every obstacle you complain of will be removed?

Mr. Alexander said that the plaintiffs had come to the conclusion that they could not fairly accept the offer.

Mr. Marten said that he ought to state that the defendant had already modified his plans, and the plaintiffs promised to tell him what they wanted done, but they had not done so.

Mr. Alexander said that he wished the undertaking to state that the defendant would not do anything further to interfere with the light or air to the plaintiffs' premises.

Mr. Marten replied that the case had nothing to do with "air." It had been stated by his learned friend that there were seven ancient lights in question, but that was a mistake, as there were only six. The fan-light was not an ancient light.

After some further discussion his Lordship made no order on the motion on the defendant giving an undertaking not to build further, and to "pull down" if found to be in the wrong at the trial. Liberty was given to apply to advance the trial.

CAPITAL AND LABOUR.

SWANSEA JOINERS' STRIKE.—A general meeting of the joiners and carpenters now on strike at Swansea was held at the Working Men's Club there on the 5th inst. Mr. F. Chanders, J.P. (Manchester), the general secretary of the Amalgamated Society of Carpenters and Joiners; Mr. W. Matkin, J.P. (Liverpool), secretary of the General Union, and County Councillor William Thorne, of the Gasworkers and Builders' Union, attended and addressed the meeting, supporting them in their contentions, and assuring them of the strong position of the

COMPETITIONS, CONTRACTS, AND PUBLIC APPOINTMENTS.

COMPETITIONS.

Nature of Work.	By whom Advertised.	Premiums.	Designs to be delivered.
ylum Extension, near Beverley.....	East Riding Lunatic Asylum Visitors ...	50*l.*, 25*l.*, 10*l.*	Oct. 28
School Buildings, Welshpool	Governors of County Intermediate Schools	21*l.*	Dec. 1
*Artisans Dwellings		50*l.*	No date

CONTRACTS.

Nature of Work or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.
Business Premises, Frenchgate, Doncaster	Killengrey & Co.....	H. Athron.....	Sept. 17
Shops, Warehouses, &c. Station-road	Doncaster Mutual Co-op. Indus. Soc.....	do.	do.
*Excavating, Laying Pipes, Manholes, &c.	Hatfield R.D.C.	— Aird	do.
*Carrying-off Storm Water	do.	do.	do.
Fifteen Cottages, Penistone, near Sheffield	Luton Town Council..	G. A. Wilson	do.
Paving Arthur-street, Bolton-road, &c. ..	Sowerby Bridge (Yorks) Corp.	*Official*	do.
Cast-iron Pipes (27,000 yards)	Office of Public Works, Ireland..	do.	do.
Gate and Gate Lodge, Viceregal Lodge, Phœnix Park, Dublin	Markinch (N.B.) Police Commissioners	do.	do.
Outfall Sewer, &c.....	Birkenhead Corp.	R. Henderson	Sept. 18
Stoneware Pipe Sewer, &c. Rock-lane	Holborn Union	C. Brownridge.....	do.
Alterations to Schools, Fair Oak, Hants	....	J. B. Colson.....	do.
*Alterations, Additions, &c. at Workhouse	B. Davies	H. Saxon Snell	do.
New Road, Castle Hill, Winchester.....	M. R. Co.	Jas. Robinson	Sept. 19
Two Houses and Offices, Clown, Derbyshire.....	do.	.....	do.
*Goods Warehouse, Leicester	Glasgow Police Com...	*Official*	do.
*Goods Shed, Wandsworth-road, London	Axbridge Union	do.	do.
Police Buildings and Fire Station, Allison-street	Walker (Northumberland) U.D.C.	A. Powell	Sept. 20
Additions to Workhouse	H. T. Twelves	T. W. Laycock.....	do.
Road Metal	St. George-in-the-East Guardians	.....	do.
Additions, &c. to Wesleyan Chapel, Whittington Moor, Derbyshire.....	Clayton and Keymer (U.D.) Sch. Bd.....	Wilson, Son & Aldwinckle	do.
*Repairs at Workhouse and Infirmary	Newmarket U.D.C ..	Loader & Long.....	Sept. 21
Additions to East District Board Schools, Burgess Hill, Sussex	Stoke-on-Trent School Board	J. W. Metcalf	do.
Broken Leicestershire Granite	Darlington Corp.	R. Scrivener & Sons ..	Sept. 23
Additions to Schools, Bucknall	Southend-on-Sea Corp.	G. G. Hoskins	do.
*Technical College	Hendon U.D.C.	H. Harlock	do.
*Laying Pipe Sewer	Alnwick Union	S. S. Grimley	do.
*Corrugated Iron Building	Lewisham Bd. of Wks.	*Official*	do.
Premises, Board Room, &c. Fenkle-street and Narrowgate	do.	do.	Sept 24
*Road-making Works, Bowness-road	Dover Town Council	do.	do.
*Road-making Works, Jutland-road	West Ham Council....	do.	do.
York Paving Stone, &c.		do.	do.
*Iron Building, Canning Town		do.	do.

CONTRACTS—*Continued.*

Nature of Work or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.
*Underground Conveniences, Holloway....	Islington Vestry.....	J. P. Barber	Sept. 24
*Surface Drainage Works	Bromley U.D.C.	*Official*	do.
*New Board Room	Walthamstow Sch. Bd	W. A. Longmore	do.
Reconstructing Reservoir	South Molton (Devon) Town Council	J. R. Shopland	do.
*New Drainage and Sanitary Works at Workhouse	Islington Guardians..	W. Smith	Sept. 26
School, Pentrepoth	Carmarthen Sch. Bd.	*Official*	Sept. 27
Drainage Works, East Runton, near Cromer	Erpingham D.C.....	R. M. Parkinson.....	Sept. 28
*Laying-down 2,750 square yards Cement Flooring	Llanelly U.D.C.	Mr. G. Watkeys.....	do.
Hospital and Wards at County Asylum, Whittingham	Lancs. Asylums Board	Simpson & Duckworth	do.
*Supply of Water Pipes	Higham, &c. Water Company	*Official*	Sept. 30
*Loose Horse Boxes, &c. at Parish Wharf ..	Paddington Vestry ..	do.	do.
Pipe Sewers, &c.	Lathom and Burscough U.D.C.....	Wood & Brodie	Oct. 1
*Town Hall and Public Offices	Hammersmith Vestry	H. Muir	Oct. 2
*Road-making Works	Wanstead U.D.C.	*Official*	Oct. 4
*Erection of Sixteen Coast Guard Houses..	Admiralty Wks. Dept.	do.	do.
Waterworks	Kells (Ireland) Town Commissioners.. ...	J. H. H. Swiney.....	Oct. 7
*Roads and Sewers	Walm Lane Estate ...	Allen & Hoar	do.
*Supply of Stores	G.W.R. Co.	*Official*	do.
*New Buildings, Alterations, &c. at Workhouse	Bromyard Union	A. H. Parker	Oct. 16
*Manufacture of Bricks	Lancashire Asylums Board	.....	Oct. 28
Broken Granite	Cromer U.D.C.	*Official*	No date
School Enlargement, Carlton-road	Nottingham Sch. Bd.	A. N. Bromley	do.
Business Premises, Stabling, &c., Folkestone	Silver Spring Mineral Water Co. Ltd	Reg. Pope	do.
Assembly Hall and Premises, near Accrington	Church Conservative Club	Empsall & Clarkson ..	do.
Road Works, Cook-street	Audenshaw (Lancs.) D.C.	J. H. Burton	do.
Schools, Troy-street, Whalley-range, Blackburn	.....	Briggs & Wolstenholme	do.
Conservative Club Buildings, Splotlands, Cardiff.....	.....	Habershon & Pawckner	do.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in.
Clerk of Works	Leigh and Atherton Joint Sewerage Bd.	.....	Sept. 18
*County Surveyorship	Civil Service Commrs.	.....	do.
*Stable Manager	West Ham Council ..	200*l.*	do.
Electrical Engineer	Hull Corporation ...	250*l.*	Sept. 19
*Estimating and Measuring Surveyor.....	London County Council	250*l.*.....	Sept. 20
*Surveyor's Assistant.....	Burnley Corp.	2*l.* 5*s.* weekly	Sept. 23
*Architectural Assistant	Newport Corp.	3*l.* weekly.....	do.
*Assistant Surveyor	Hanley Corporation ..	120*l.*	Oct. 7
*Instructor in Building Construction	Kent County Council	.....	No date
*Teacher of Woodwork, &c.....	Hove and Aldrington School Board.....	100*l.*	do.

Those marked with an asterisk (*) are advertised in this Number. *Competition, p.* iv. *Contracts, pp.* iv., vi., vii., *and* viii. *Public Appointments, pp.* xviii. *and* xx.

unions, and their ability to fully carry out the strike pay. They further promised that work should, if necessary, be found in other towns for every man now out. It was decided that the masters should be again approached and a last effort made to settle the dispute amicably.

SCOTTISH BUILDING TRADES' FEDERATION.—The first meeting of the executive of the recently-formed Scottish Building Trades' Federation was held on the 4th inst. in the rooms of the Building Trades' Exchange, Glasgow, Mr. David Heron, builder, Edinburgh, President, in the chair. Members were present from all parts of the country. Mr. James L. Selkirk, was elected Secretary and Treasurer. Arrangements were made for securing the affiliation of all trade associations throughout the country connected with the various branches of the building trade, and also for forming local associations where these did not at present exist. The annual meeting of the Federation was fixed to take place in Glasgow on October 23.

STRIKE IN THE LONDON BUILDING TRADE.—A dispute between the employés of Messrs. Mowlem & Burt and the firm has just taken place. The dispute commenced on account of the employment of a man who is notorious in the trade for having taken situations from which the workmen had withdrawn on strike, and upon his appearance a deputation waited on the employers' representatives and asked for his removal. This was refused, the firm saying they would stop work altogether rather than give way, and the bricklayers to the number of fifty or more at once stopped work, bringing out their labourers with them. The works struck are in the City-road.

MEETINGS.

FRIDAY, SEPTEMBER 13.

Sanitary Institute (Lectures for Sanitary Officers).—Mr. J. Castell-Evans, F.I.C., on "Elementary Physics and Chemistry: the Atmosphere, its Physical Properties." III. 8 p.m.

SATURDAY, SEPTEMBER 14.

Architectural Association.—Visit to the Vyne, near Basingstoke.

TUESDAY, SEPTEMBER 17.

Sanitary Institute (Lectures for Sanitary Officers).—Mr. J. Castell-Evans, F.I.C., on "Elementary Physics and Chemistry: Water." IV. 8 p.m.

WEDNESDAY, SEPTEMBER 18.

Builders' Foremen and Clerks of Works' Institution.—Ordinary Meeting of the Members. 8 p.m.

FRIDAY, SEPTEMBER 20.

Sanitary Institute (Lectures for Sanitary Officers).—Mr. J. Castell-Evans, F.I.C., on "Elementary Physics and Chemistry: The Chemistry of Fuel and Combustion."—V. 8 pm.

SATURDAY, SEPTEMBER 21.

Northern Architectural Association.—Visit to Messrs, Swan & Hunter's, Wallsend.

Liverpool Engineering Society.—Excursion to the Wirral Railway Works. Sir D. Fox, Chief Engineer.

RECENT PATENTS:

ABSTRACTS OF SPECIFICATIONS.

17,747.—PAINT: *F. Oliver.*—This patent relates to the use of a solution of liquid celluloid instead of the oils or turpentine which usually form the basis of common paint. Ordinary pigments may be added, or the liquid may be used pure. To prevent quick drying, a small quantity of glycerine may be mixed with the liquid.

17,797.—WINDOWS: *J. Kennedy.*—The invention deals with a fastener for windows which allows the sashes to be partly opened with security. A T-shaped piece acts as a lever, and is pivoted so that the ends of the cross-piece engage with two short bolts. The bolts and lever are fixed in a small box, which is fastened to the top of the lower sash in such a position that the bolts may slide horizontally and come in contact with stops which are arranged on a strip of wood or metal attached to the outer sash.

18,486.—DOOR-BOLTS: *O. Steed.*—An ordinary bolt, square in section, slides upon carriers fixed to a metal plate, and has a groove or slot across one end which extends about half its depth. A heart-shaped plate is secured in an eccentric position, and has its edge turned up to fit in the slot of the bolt. On the plate being turned by means of a handle, the bolt is shot backward or forward.

25,291.—CHIMNEY-COWLS: *H. John.*—Deals with a cowl composed of several parts. A circular tube to be fixed in the chimney is surmounted by a suction-cone made of two or more segments, and provided with wind-vanes. A hood formed of two overlapping pieces which afford entrances for wind, is arranged above the cone, and is supported by a spindle-sleeve surmounted by a cap, and turns on a spindle fixed to the top of the suction-cone. A weather-vane consisting of two blades, or plates, is rivetted to the upper part of the hood, the said plates being of such dimensions and fixed at such an angle that the movements of the cowl will not be affected by a similar cowl applied to an adjacent chimney.

4,548. FIRE-GRATES: *J. Marcroft.*—This invention pertains to a grate to be used in fireplaces in addition to the ordinary grate for the purpose of providing an air space underneath and behind the burning fuel. The grate is composed of a number of straight bars fitted transversely on a curved frame, which is provided with suitable hooks for engaging with the fire-bars in front. A plate of fire-clay forms the support at the back, being placed in a sloping position.

11,495. VENTILATORS: *C. Field.*—This invention is intended to cause an up-draught in a ventilating shaft or a chimney. A cone-shaped piece is supported over a cylindrical shaft by means of metal strips, space being left for the exit of smoke or air from within. The cone and top of the shaft are encompassed by an outer case, which is suitably arranged to admit an upward draught from the exterior.

NEW APPLICATIONS FOR LETTERS PATENT.

AUG. 26.—16,007, T. Ford, Chandeliers, Gaseliers, Gas Pendants, and Gas-brackets, &c.

AUG. 27.—16,047, H. Weatherill, Fittings for Doors and Windows, for Checking Vibration and Banging, and for Closing same when required.—16,073, J. Hickton, Self-retaining Windows.

AUG. 28.—16,121, R. Robinson, Rain-water Fall or Stack-pipes for Buildings.—16,138, T. Innocent, Self-closing Hinges.—16,144, J. Oldfield, Water-waste Preventers.

AUG. 29.—16,177, A. Mitchell, Door-knobs.—16,181, J. Titley, Automatic Multiple Wood-Turning Machine.—16,186, R. Smith, Hand Levels.—16,202, J. Wootton, Manufacture of Bricks, Tiles, Pipes, &c.—12,234, H. Rudebock, Weather Strips.

AUG. 30.—16,262, E. Bernard, Syphon-closets.—16,265, A. Pinfold, Closet-seats.—16,312, J. Ross, and A. Heiron, Paint.—16,314, L. Martin, Glazed Brick or Tile.

AUG. 31.—16,325, F. Collins, Indicating Bolts for Water-closets, Lavatories, &c.—16,327, J. Morton and R. Shadbolt, Kilns for Burning Fire-bricks, Retorts, Pottery, &c.—16,334, P. Birkett, Fasteners for Sashes, Casements, Doors, &c.—16,337, R. Harrison, Securing Chimney-pots to Stacks.—16,339, F. Egleton, Cutter-bracket for Securing O. G. and other Gutters.

PROVISIONAL SPECIFICATIONS ACCEPTED.

14,341, E. Wauke and J. Hellige, Holder for Casement Windows.—14,634, E. Eliot, Indicating Device for Doors

and Gates.—14,662, J. Hardy, Valve Arrangement for Syphons used in Cisterns.—14,815, G. Johns, Cramp for Light Wooden Frames, &c.—15,030, R. Doenitz, Ventilating Elbow-pipe for Stoves.—15,042, S. Rowley, Syphon Water-closet.

COMPLETE SPECIFICATIONS ACCEPTED.

(Open to Opposition for Two Months.)

18,384, W. Thomas, Ventilation.—19,773, J. Biggs, Ventilation of Sewers.—20,371, The Simplex Window Fitting Co. and P. Daw, Bolts and Fastenings for Windows, &c. 20,736, J. Stein, Kilns.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

SEPT. 2.—By *Alfred Thomas, Peyer, & Miles:* The South Malling Brewery, Lewes, Sussex, together with 17 public and beer houses, f., l. and c., 16,100*l.*; "The Nag's Head" public-house, Eynesbury, Hunts., f., r. 10*l.*, 500*l.*; "The Bell" beerhouse, St. Neots, Hunts., f., 200*l.*; "The Bell" public-house, Eaton Socon, Beds., and 1¾ acres, f., r. 17*l.*, 725*l.*; "The Old Sun Inn" public-house, Wyboston, Beds., and 1¾ acres, f., r. 8*l.*, 325*l.*

SEPTEMBER 3.—By *P. Hodson:* 12, Chase Green-av., Enfield, u.t. 86 yrs., g.r. 10*l.* 10s., e.r. 50*l.*, 410*l.*; 6 and 8, Eve-rd., West Ham, u.t. 86 yrs., g.r. 6*l.*, 135*l.*—By *E. Simpson:* 1 to 7, Waterfall Cottages, Merton, f., r. 109*l.* 4s., 1,000*l.*—By *W. Whiteley:* 10, 12, 14, and 16, Nursery-st., Wandsworth, u.t. 32 yrs., g.r. 12*l.*, 255*l.*

SEPTEMBER 4.—By *Gairdner & Warton:* F.g.r. of 11*l.* 11s., Great College-st., Camden Town, reversion in 27½ yrs., 470*l.*

SEPTEMBER 5.—By *Daniel Watney & Sons:* Bucksteep Mill Farm, Warbleton, Sussex, and 86 acres, f., 740*l.*—By *H. A. Henderson:* 23, Queen's Down-rd., Clapton, f., r. 50*l.*, 675*l.*

[*Contractions used in these Eists.*—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; e.r. for estimated rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; yd. for yard, &c.]

PRICES CURRENT OF MATERIALS.

TIMBER.		
Greenheart, B.G.	ton	8/0/0 0/0/0
Teak, E.I.	load	10/0/0 16/0/0
Sequoia, U.S. ft. cu		1/10 2/2
Ash, Canada	load	3/0/0 4/5/0
Birch, do.		2/0/0 3/5/0
Elm, do.		3/15/0 5/0/0
Fir, Dantsic, &c.		2/0/0 3/10/0
Oak, do.		2/15/0 4/15/0
Canada		6/5/0 7/15/0
Pine, Canada red		0/0/0 0/0/0
Do. Yellow		2/10/0 4/15/0
Lath, Dantsic, fath		4/10/0 5/10/0
St. Petersburg		5/0/0 6/10/0
Wainscot, Riga, &c., log		2/15/0 5/0/0
Odessa, crown		2/15/0 5/0/0
Deals, Finland 2nd & 1st std 100		7/0/0 8/10/0
Do. 4th & 3rd		7/0/0 8/0/0
Do. Riga		7/0/0 8/0/0
St. Petersburg, 1st yellow		9/10/0 12/0/0
Do. 2nd yellow		7/10/0 9/0/0
Do. white		8/0/0 9/10/0
Swedish		7/0/0 15/10/0
White Sea		7/5/0 14/0/0
Canada, Pine 1st		21/0/0 24/0/0
Do. do. 2nd		16/0/0 17/0/0
Do. do. 3rd, &c.		8/0/0 10/0/0
Do. Spruce, 1st		9/0/0 10/10/0
Do. do. 3rd and 2nd		6/10/0 7/10/0
New Brunswick		6/0/0 7/0/0
Battens, all kinds		5/0/0 21/0/0
Flooring boards, sq., 1 in. prep. 1st		0/9/6 0/14/6
Do. 2nd		0/6/6 0/11/6
Other qualities		0/4/6 0/7/6
Cedar, Cuba	ft.	/3 /4
Honduras, &c.		/3 /4½
Mahogany, Cuba		/3 /6
St. Domingo, cargo av.		/3 1/0
Mexican do. do.		/3 /4
Tobasco do. do.		/3½ /6
Honduras do.		/3½ /5½
Box, Turkey	ton	4/0/0 15/0/0
Rose, Rio		7/0/0 16/0/0
Bahia		6/0/0 15/0/0
Satin, St. Domingo		0/0/5 0/1/0

TIMBER *(continued)*.		
Satin, Porto Rico	0/0/6	0/1/6
Walnut, Italian	0/0/3	0/0/7
METALS.		
Iron—Pig, in Scotland	ton 2/8/3	0/0/0
Bar, Welsh, in London	5/12/6	5/15/0
Do. do. at works in Wales	5/2/6	5/5/0
Do. Staffordshire, in London	6/0/0	6/10/0
COPPER—British cake and ingot	50/10/0	51/0/0
Best selected	51/0/0	51/10/0
Sheets, strong	57/0/0	0/0/0
Chili bars	46/10/0	46/15/0
YELLOW M'TAL lb	0/0/4½	0/0/4⅝
LEAD—Pig, Spanish	ton 11/0/0	11/2/6
English com. brands	11/2/6	11/5/0
Sheet, English, 6 lbs. per sq. ft. and upwards	12/0/0	0/0/0
Pipe	12/10/0	0/0/0
ZINC—English sheet	ton 18/5/0	0/0/0
Vieille Montagne	18/15/0	0/0/0
TIN—Straits	64/15/0	65/5/0
Australian	66/0/0	66/10/0
English Ingots	67/15/0	68/0/0
Banca	66/10/0	67/0/0
Billiton	65/5/0	65/15/0
OILS.		
Linseed	ton 20/7/6	20/15/0
Cocoanut, Cochin	24/0/0	0/0/0
Do. Ceylon	23/0/0	0/0/0
Palm, Lagos	22/15/0	0/0/0
Rapeseed, English pale	22/0/0	0/0/0
Do. brown	20/10/0	20/15/0
Cottonseed ref.	17/5/0	17/15/0
Oleine	20/10/0	21/10/0
Lubricating, U.S.	5/9/0	8/3/0
Do. black	4/6/0	6/6/0
TAR—Stockholm	barrel 0/19/6	0/0/0
Archangel	0/14/6	0/0/0

TENDERS.

[Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than* 10 *a.m. on Thursdays.*]

CONISBOROUGH (Yorks.).—For the erection of four houses. Mr. H. L. Smethurst, architect, Conisborough:—

H. Wortley	£1,134 0	L. Sanders, Mexboro*	£854 16
J. Downing	960 0	* Accepted.	

CREWKERNE.—For erecting a factory at Crewkerne, Somersetshire, for Mr. J. H. Walters. Mr. Henry Hall, architect, 19, Doughty-street, W.C. Quantities supplied by the architect:—

Green	£3,995	Turner	£3,459
Trask and Son	3,815	Horton & Co.	3,420
Chinchen	3,700	Tozer	3,375
Tree & Bolley	3,691	Roberts	3,372
Jenkins & Son	3,594	Lye & Son	3,192
Hatheley & Carr	3,555		

EGHAM.—For alterations and additions to Station-road Board Schools, Egham:—

Searle & Sons	£1,968	J. Norris & Sons	£1,767
A. Simpson	1,945	G. Gray	1,697
Beauchamp & Rowland	1,770		

HINDLEY (Lancs.).—For paving, flagging, kerbing, &c., Lord-street and two others, for the Urban District Council. Mr. Holden, Surveyor, Council Offices, Cross-street, Hindley. Quantities by Mr. Alf. Holden, A.M.Inst.C.E.:—

Robert Bradley	£1,539 3 5!	Samuel Hutton	£740 11 3!
Joshua Bradley	764 7 7		

[Surveyor's estimate, £860 13s. 10d.]

HALIFAX.—Accepted for the erection of extensive maltings, Hipperholme, for Messrs. Brear & Brown, Ltd. Messrs. Jackson & Fox, architects, 22, George-street, Halifax. Quantities by the Architects:—

Masonry.—Thos. Pickles, Luddenden Foot
Carpentry and Joinery.—Fielden & Bottomley, Halifax
Plumbing and Glazing.—C. G. Calvert, Lightcliffe
Slating and Plastering.—J. Bancroft & Son, Halifax
Iron and Steel Work.—Jas. Mackrill, Elland
Concreting.—Stuart Granolithic Stone Co., London
} £6,391

LLANDILOFAWR (Wales).—For additions to school buildings, Bettws, for the U.D. School Board. Mr. Henry Herbert, architect, Brynmaries, Ammanford:—

J. D. Williams	£1,160 0	David Thomas and William Evans	£996 10
David Jenkins	1,090 0	Thomas & Stephens	924 13
Thomas Griffiths & Son	1,080 0	Elias Morgan	901 10

LONDON.—For public baths and wash-houses to be erected at Laurie Grove, New Cross, Deptford. Mr. Thomas Dinwiddy, architect. Quantities by Mr. W. T. Farthing:—

		For brick-work in cement add
James J. Wise	£36,552	£322 0
G. E. Todd	34,773	513 10
B. E. Nightingale	33,975	490 0
Balaam Bros.	33,875	480 0
G. Goodson & Sons	33,875	480 0
Harris & Wardrop	33,837	431 0
F. & H. F. Higgs	33,800	465 0
H. Wall & Co.	33,747	469 0
Killby & Gayford	33,600	473 0
Charles Wall	33,493	460 0
Walter Wallis	32,999	500 0
G. E. Wallis & Sons	32,669	485 0
S. J. Jerrard & Sons	32,683	376 0
H. L. Holloway	32,500	450 0

LONDON.—For general repairs at 166 and 168, Oxford-street, and warehouse in rear in Winsley-street, for Messrs. Riddle Bros. Mr. A. J. Hopkins, architect, 37, Mortimer-street, W.:—

W. Bywaters	£3,918	Beer & Gash	£2,723
Patman & Fotheringham	3,877	Kearley	2,659
Mattock Bros.	3,772	Cowley & Drake	2,615
Webber	3,720		

LONDON.—Accepted for providing new beer-engines, pewtering work, &c., for Messrs. Grimes & Co., the "Red Lion," Camberwell Gate. Mr. W. M. Brutton, architect, 171, Queen Victoria-street:—

H. & F. Warne £250

[No competition.]

LONDON.—Accepted for providing new beer-engines, pewtering work, &c., at the Clerkenwell Distillery Stores, York-road, Battersea, for Messrs. Grimes & Co. Mr. W. M. Brutton, architect, 171, Queen Victoria-street:—

H. & F. Warne £280

[No competition.]

LONDON.—For interior alterations for 65, Crouch-hill, for Mr. W. Harpham. Mr. F. H. Stringer, architect, 42, Hanley-road, Stroud-green, N.:—

Shearing Bros.	£114	Marchant & Hirst	£94
H. W. Say	96		

LONDON.—For interior and exterior painting at the "Black Bull" public-house. Mr. A. Pridmore, architect, 2, Broad-street Buildings:—

Green	£142 15 0	Yule	£114 8 0
Harrison & Co.	128 0 0	Marchant & Hirst	112 10 0
London & Co.	126 0 0	Thorogood & Co.	93 0 0
Williams	121 8 9	King	83 5 0
Homewood	119 0 0		

LONDON.—For exterior painting of Barrett-street Board School, for the School Board for London. Mr. T. J. Bailey, Architect:—

Davis Bros.	£148 0 0	Foxley	£86 0 0
Harrison & Spooner	144 8 6	Callon	76 11 6
Kybett	132 0 0	Chappell	72 0 0
Eady	92 17 6	Marchant & Hirst	69 0 0
Cheston	90 0 0	Cowley & Drake	67 10 0
Stevens Bros.	88 0 0		

LONDON.—For the exterior painting of Ackmar-road Board School, for the School Board for London. Mr. T. J. Bailey, Architect:—

Minter	£157 0	Polden	£122 10
Hammond	147 0	Hide & Co.	119 12
Neal	144 0	Brown	115 0
Williams	130 0	Marchant & Hirst	112 0

LONDON.—For the exterior painting of Aldenham-street Board School, for the School Board for London. Mr. T. J. Bailey, Architect:—

Cruwys	£138 0 0	Hornett	£105 0 0
Johnson	127 0 0	Marchant & Hirst	102 0 0
Sparks	128 0 0	Vernall & Danes	95 0 0
Riley	118 16 9	Stevens Bros.	79 10 0

LONDON.—For interior alterations for heating the Great College-street School:—

Vernall & Danes	£395	Sparks	£334
Yerbury & Son	358	Marchant & Hirst	313
Cowley & Drake	355	Kirby & Chase	275
Ballard & Son	344		

LONDON.—For new shop-front, for Mr. Matthews, Kentish Town-road. Mr. W. E. Davis, architect, Falcon-court, Fleet-street:—

Bowley & Grove	£135 0	Marchant & Hirst	£83 10
Throughgood & Brewer	87 0	Spiers & Son	72 0

LONDON.—For alterations and additions to the Industrial Schools, Forest Gate, E., for the Board of Managers. Mr. G. E. Holman, architect:—

Julian	£225 0	Cooper	£174 0
Hosking	198 0	Bulliford	166 0
Sheffield	197 0	Holland	156 10
White & Sons	180 0	Craig	153 10
Symes	178 0		

LONDON. — Accepted for new drainage works at Quinn's Buildings, Popham-street, Essex-road, N., for Miss Gee. Messrs. A. B. Frend & C. G. Keogh, architects and surveyors, Bloomsbury Mansions:—

William Mills, Westcombe Park £379

LONDON. — Accepted for drainage, &c., at Queen-street, Deptford, S.E., for Mr. Teb. Mr. Edward Lewis, surveyor:—

William Mills, Westcombe Park £122

LONDON.—For alterations to lavatories and extension of engine-house at the Stepney Union. Mr. G. E. Holman, architect:—

Craig	£2,548	Lawrence	£2,327
Holland	2,473	Hoskings	2,317
W. Wells	2,390	White & Son	2,313
R. S. Cooper	2,329	Symes	2,100

LONDON.—For sundry painting, &c., at the Stepney Union. Mr. G. E. Holman, architect:—

Bendon	£1,230	Vigor	£790
White & Son	1,150	R. S. Cooper	789
Wilson	1,125	Holland	780
Johnson	1,050	Wales	732
Darby	922		

LONDON.—For alterations to servants' hall, at the Forest Gate Schools. Mr. G. E. Holman, architect:—

Julian & Lockyer	£221 0	Bulford	£166 0
Hoskings	198 0	R. S. Cooper	164 0
Sheffield	197 0	Holland & Hooker	156 10
White & Son	180 0	Craig	153 10
Simes	178 0		

LONDON.—For the rebuilding of Nos. 71 and 72, Piccadilly, W., for Messrs. Percy Edwards & Co. Mr. Ebenezer Gregg, architect. Quantities by Messrs. S. Young & Brown:—

Holland & Hannen	£12,980	Holloway Bros.	£11,100
Ashby & Horner	12,672	G. H. & A. Bywater	10,897
Hall, Beddall, & Co.	12,586	W. Shepherd	10,575
B. E. Nightingale	11,973	Perry & Co.*	10,545
G. S. S. Williams & Son	11,427	* Accepted.	

LONDON.—Accepted for the erection of business and residential premises, Tothill-street, Westminster, for Mr. R. Woodford. Mr. A. E. Northcote, architect:—

Kennard Bros., Lewisham £2,500

LONDON.—For exterpal painting to Messrs. Francis & Co.'s shutter-factory, Nos. 64 to 74, Gray's Inn-road. Mr. Walter Graves, architect:—

Barker & Strutt	£110 0	Siegman	£83 10
J. B. Colwill	85 0	H. & E. Lea	60 0

LONDON.—For new board schools, on the Woodstock-road site, Hornsey, to accommodate 1,351 children, together with manual instruction-room and cookery-school. Messrs. Mitchell & Butler, architects, 16, Finsbury-circus, E.C.:—

Colls & Son	£30,295	Treasure & Son	£27,624
Brown, Son, & Blomfield	30,173	Clarke & Bracey	27,199
Lawrence & Co.	29,989	B. Nightingale	27,100
Mattock Bros.	29,252	Charles Wall	26,979
Scrivener & Co.	28,971	Kirk & Randall*	26,768

* Accepted subject to the approval of the Education Department.

MANCHESTER.—For the execution of sewage works for the Bredbury and Romiley Urban District Council. Messrs. Spinks & Beever, engineers. Quantities by engineers:—

A. Taylor	£2,273 7 0	J. Nuttall	£1,781 7 6
M. Naylor & Son	2,230 0 0	B. Armitage	1,761 4 7½
Etheridge & Clark, E. Tempest	1,924 6 0	J. Fairbrother & Co., Hyde*	1,588 11 6
	1,851 15 0	Wm. Bennisom	1,577 9 0
Geo. Bell & Co.	1,788 0 0	* Accepted.	

MARSKE (Yorks.).—For the construction of storage reservoir, for the Redcar Urban District Council. Mr. E. W. Lyall, C.E., 39, Northgate, Darlington:—

W. T. Weir	£2,250 0 0	C. B. Williamson & Co.	£1,595 8 4
Whitaker Bros., Ld.	2,090 0 0	Cruddas & Son	1,485 4 4
Joseph Howe & Co.	1,980 0 0	Charles Winterburn.	1,380 0 0
Thomas Dickinson	1,974 0 0	W. C. Atkinson*	1,380 12 2
Parker & Sharpe	1,846 0 0	Edmund Attwood	1,060 0 0
Robinson Harland	1,738 0 0	* Accepted.	

ORPINGTON (Kent).—For the erection of a pair of country villa-residences. Mr. St. Pierre Harris, architect, 8, Ironmonger-lane, E.C., and Orpington:—

Somerford & Son	£740	Stebbings & Pannett, Sidcup*	£656
T. Knight	690	* Accepted.	

ORPINGTON (Kent).—For alterations and repairs to properties in Anglesea-road. Mr. St. Pierre Harris, architect and surveyor, 8, Ironmonger-lane, E.C., and Orpington:—

H. Glassup	£245	Stebbings & Pannett, Sidcup*	£205
W. R. Taylor	243	* Accepted.	

ORPINGTON (Kent).—Accepted for a further pair of labourers cottages. Mr. St. Pierre Harris, architect, 8, Ironmonger-lane, E.C., and Orpington:—

Stebbings & Pannett £390

[No competition.]

READING.—For the erection of a covered stand and dressing-boxes, at Palmer Park. Mr. J. Bowen, Borough Engineer and Surveyor, Town Hall, Reading:—

J. H. Margetts	£445	T. Pilgrim, Reading*	£397
W. Hawkins	418		

[Borough Engineer's estimate, £420.]

* Recommended for acceptance.

ROTHERHAM.—For the erection of police-offices and courts, for the Corporation of the Borough of Rotherham. Mr. Richard J. Lovell, architect, 46, Queen Victoria-street, E.C. Quantities by Mr. James Kennedy, 31, Great James-street, Bedford-row, W.C.:—

Chadwick	£11,570 0	S. Warburton	£9,100 0
W. Ives & Co.	10,646 0	A. T. Ripley	9,095 0
G. H. Smith	10,300 0	Richard Snell, Rotherham*	9,090 0
R. Snell	9,728 0	H. Arnold & Son †	8,785 0
W. Binns	9,447 12		
Thornton & Son	9,365 0		

* Accepted. † Withdrawn.

RUSHDEN (Northants.).—For the erection of two houses, Brookfield-road, for Messrs. Hodson & Osborne. Mr. H. Adnitt, architect, Harborough-road, Rushden. Quantities by the architect:—

T. & C. Berrill	£513 0	Whittington & Tomlin	£473 0
G. Henson	498 10	C. Bayes & Son	470 0
H. Sparrow	490 0	T. Swindall, Rushden*	440 0
T. Wilmott, jun.	480 0	A. Revitt	437 0
R. Marriott	476 0	* Accepted.	

RUSHDEN.—For erecting three houses, Grove-street, Rushden, for Messrs. Knight & Bradfield. Mr. H. Adnitt, architect, Rushden :—

G. Henson	£757 0	H. Sparrow	£684 0
T. & C. Berrill	691 0	C. Bayes & Son	678 10
T. Wilmott, jun.	690 0	F. Henson, Rushden (accepted)	670 0
Whittington & Tomlin	689 0	A. Revitt	641 5
T. Swindall	685 0		

RUSHDEN.—For the erection of four houses, Brookfield-road, Rushden, for Messrs. Fisher & Wadsworth. Mr. H. Adnitt, architect, Rushden :—

H. Sparrow	£805	C. Bayes & Son	£875
Hacksley Bros.	890	W. T. Whitbread	866
Whittington & Tomlin	889	T. Wilmott, jun.	855
T. & C. Berrill	883	T. Swindall, Rushden *	809

* Accepted.

RUSHDEN.—For the erection of four houses, Windmill-road, Rushden, for Mr. J. Lack. Mr. H. Adnitt, architect, Rushden :—

Hacksley Bros.	£926	T. & C. Berrill	£843
T. Swindall	859	T. Wilmott, jun.	830
Whittington & Tomlin	848	R. Marriott	829
C. Bayes & Son	845	H. Sparrow (accepted)	795

RUSHDEN.—For the erection of two houses, Hayway-road, Rushden, for Mr. W. Elstow. Mr. H. Adnitt, architect, Rushden :—

R. Marriott	£547 0	C. Bayes & Son	£539 0
Whittington & Tomlin	545 0	W. T. Whitbread	526 0
H. Sparrow	540 0	T. Wilmott, jun.	518 10
T. & C. Berrill	539 0	F. Henson	485 0

SOUTH WOODFORD.—For the erection and completion of detached residence at South Woodford, for Mr. A. McAllister. Mr. H. T. A. Chidgey, architect, Effingham House, Arundel-street, W. C. Quantities supplied :—

Osborn	£985 0	French	£778 0
Riley	950 10	George Barker	760 13
Crepon	793 0	Carter	700 0
Sim & Slowe	779 0		

SWANLEY (Kent).—Accepted for the erection of a further block of six cottages at Moultain Hill. Mr. St. Pierre Harris, architect, 8, Ironmonger-lane, E.C., and Orpington :—

Stebbings & Pannett £1,167

No competitton.]

WEST BROMWICH.—For the erection of school buildings, Earl-street, Gun's Village, for the School Board. Mr. Edwd. Pincher, architect, Victoria-street, West Bromwich :—

John Dallow, Blackheath, Dudley * £3,085

* Lowest of ten tenders sent in.

TO CORRESPONDENTS.

A. H. & Co. (below our limit; items must exceed £100).

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PUBLISHER'S NOTICES.

Registered Telegraphic Address, 'THE BUILDER, 'LONDON.

THE INDEX, with TITLE-PAGE, for Volume LXVIII. (Jan. to June, 1895) was given as a supplement with the number for July 13.

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Advertisements for the current week's issue are received up to THREE o'clock p.m. on THURSDAY, but "Classification" is impossible in the case of any which may reach the Office after HALF-PAST ONE p.m. on that day. Those intended for the front Page should be in by TWELVE noon on WEDNESDAY.

SPECIAL.—ALTERATIONS IN STANDING ADVERTISEMENTS or ORDERS TO DISCONTINUE same must reach the Office before 10 a.m. on WEDNESDAY MORNING.

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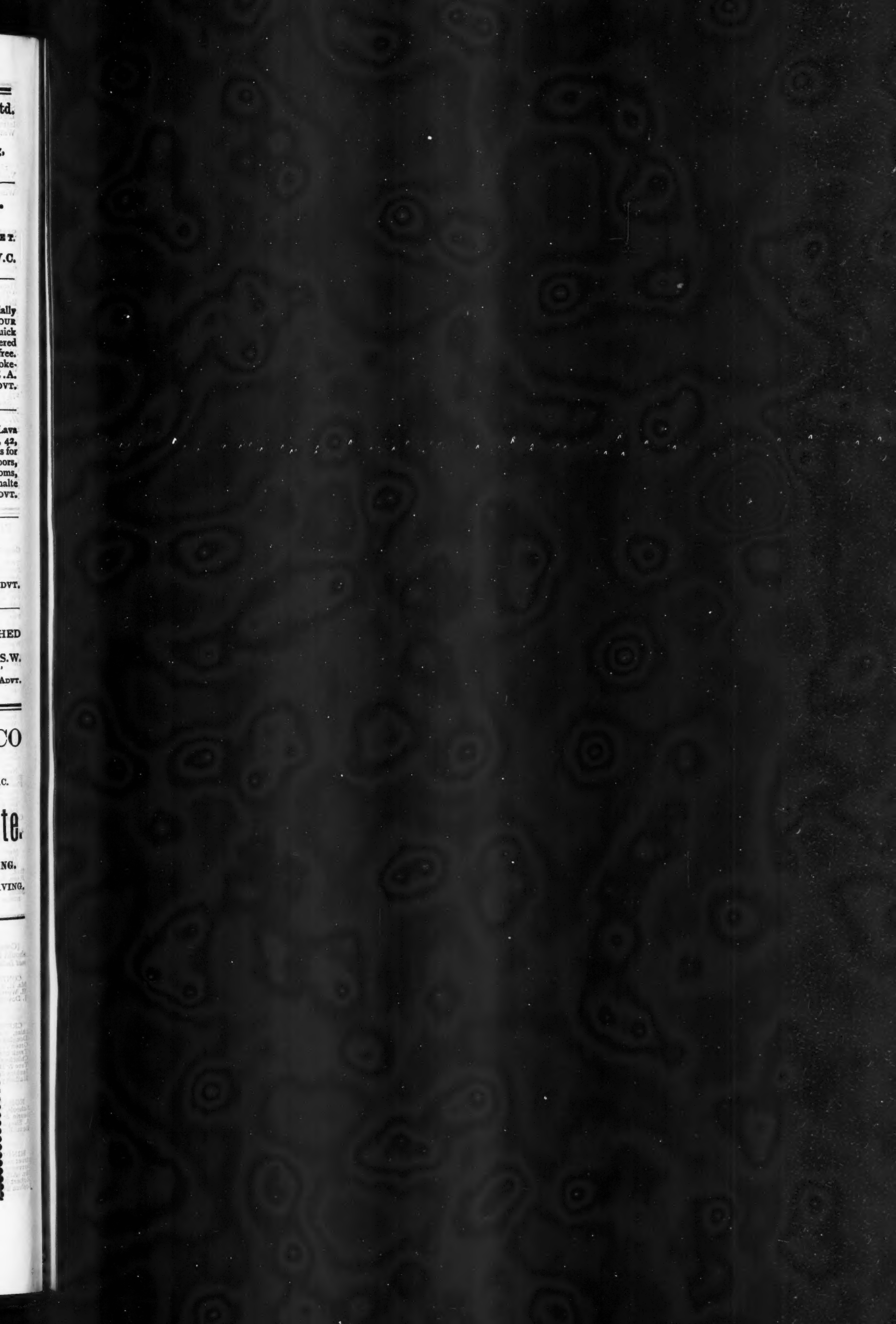

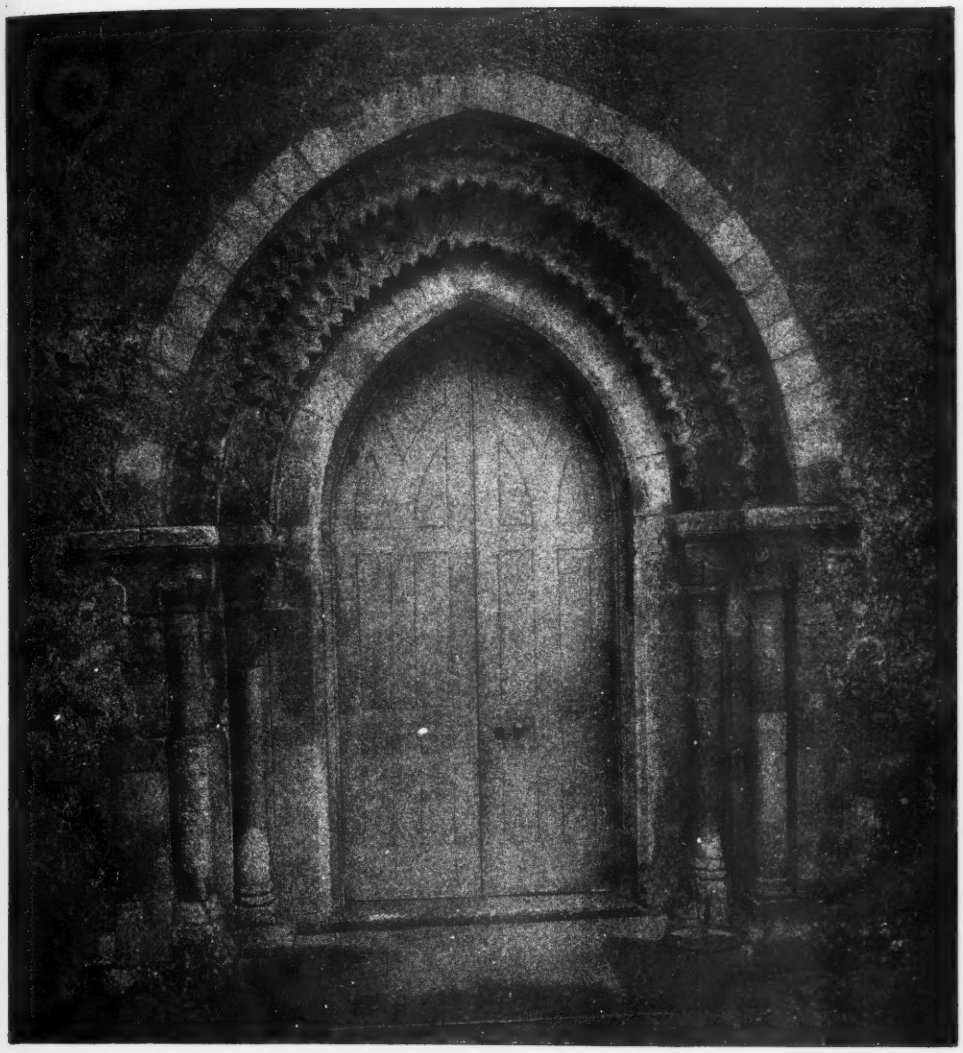

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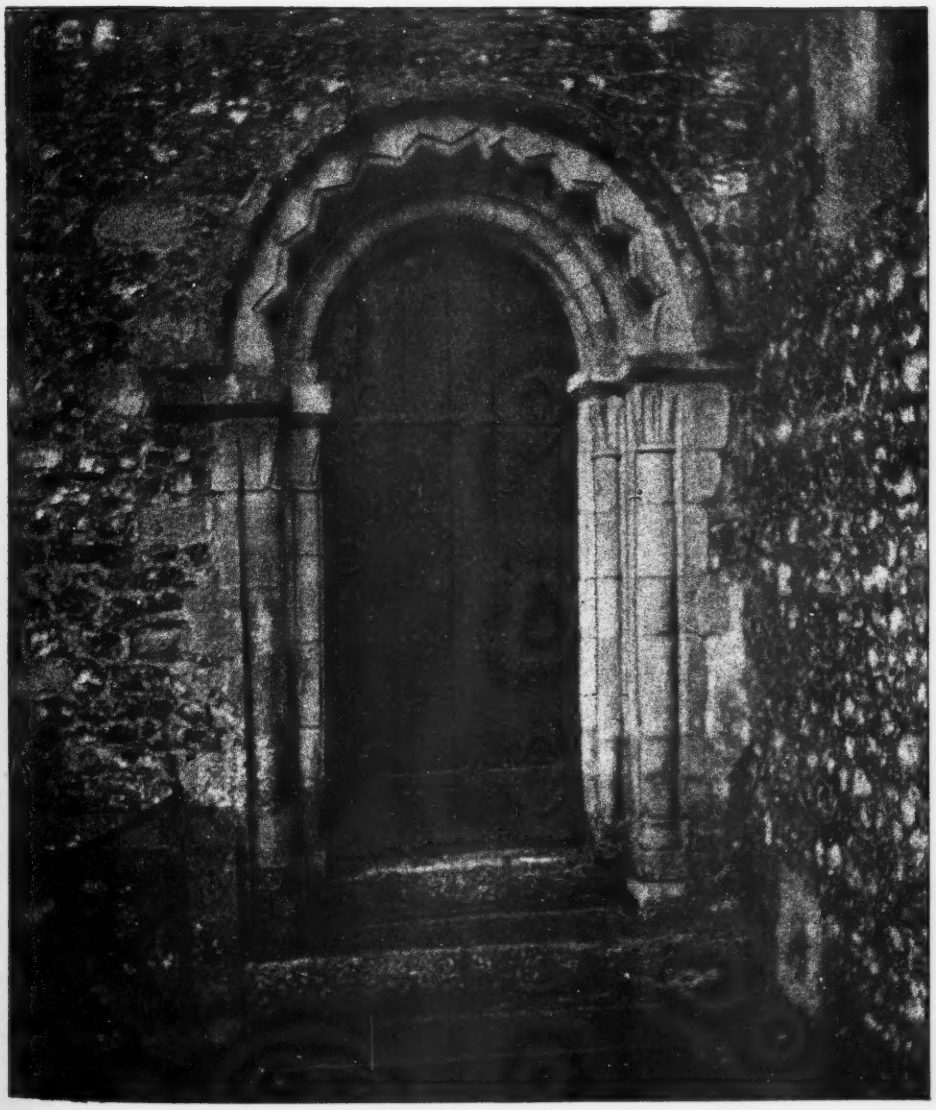
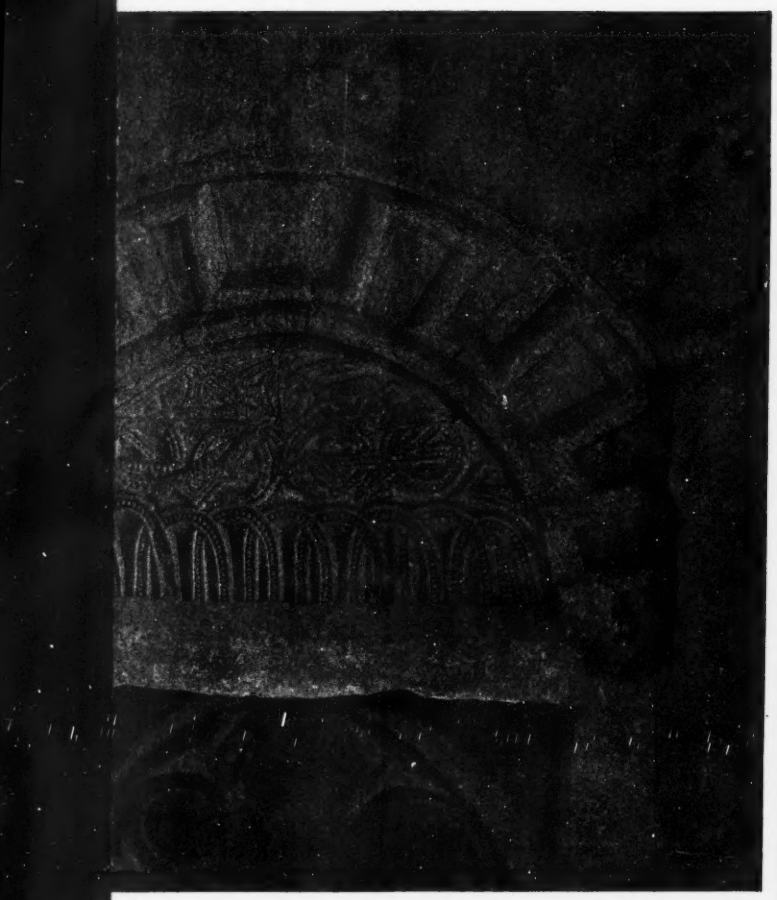


OSPRINGE . CHANCEL DOOR.

TYMPANUM, ST. CLEMENT'S, SA

INTERIOR DOOR IN NAVE, CHI

NORMAN DOORWAYS IN K



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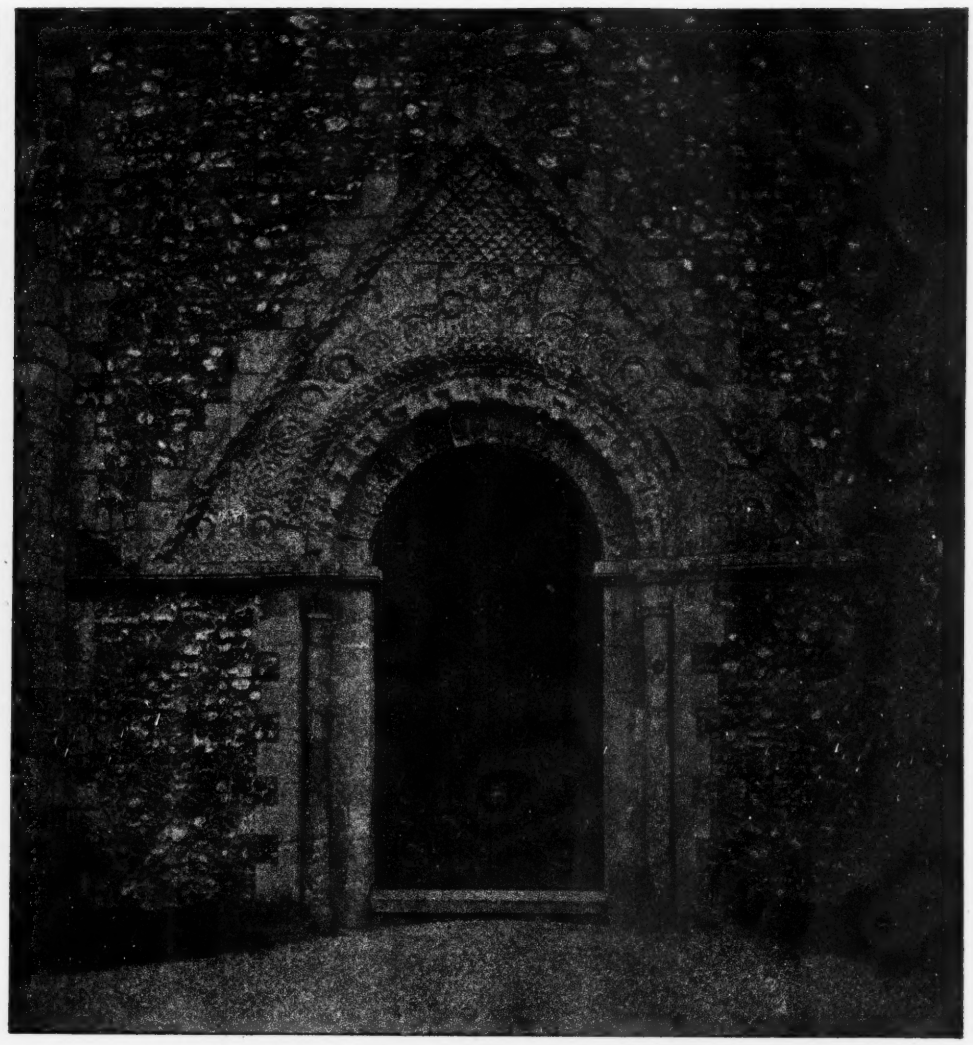

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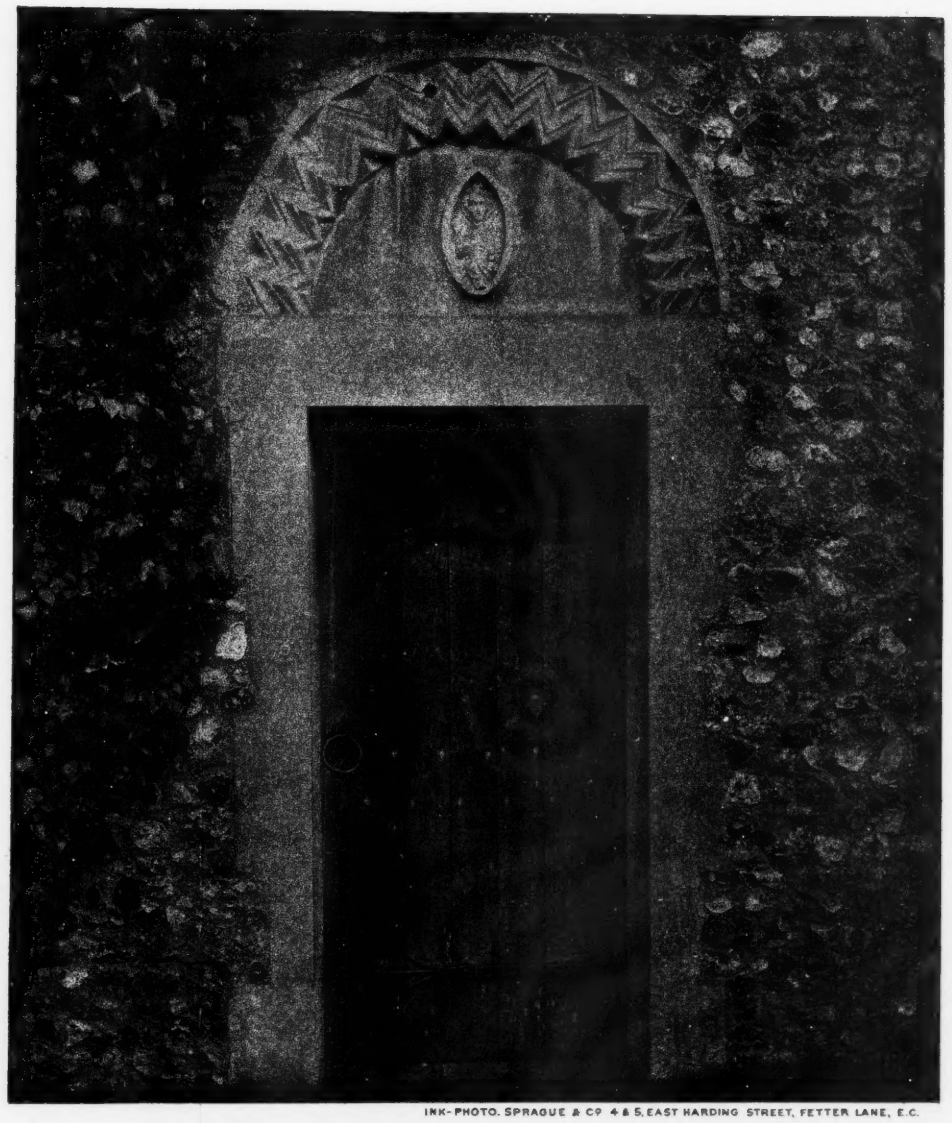

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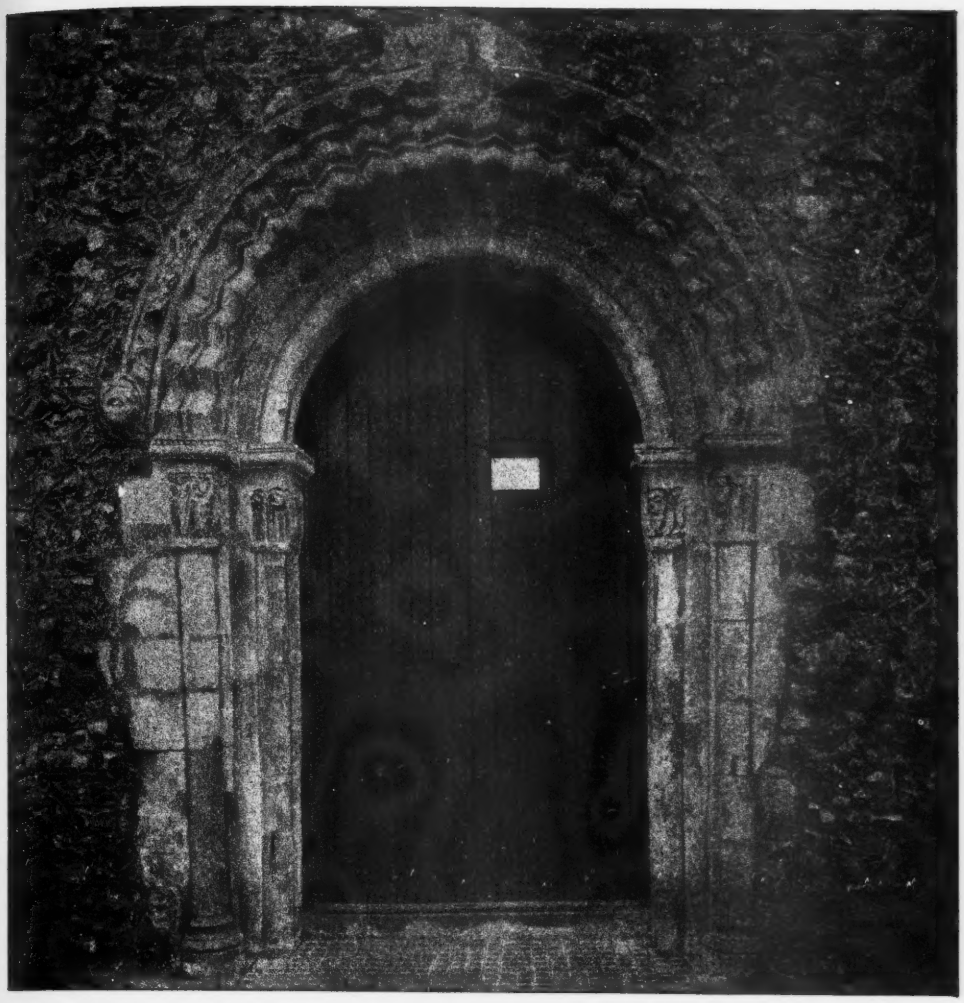
ORMAN DOORWAYS IN KENT.



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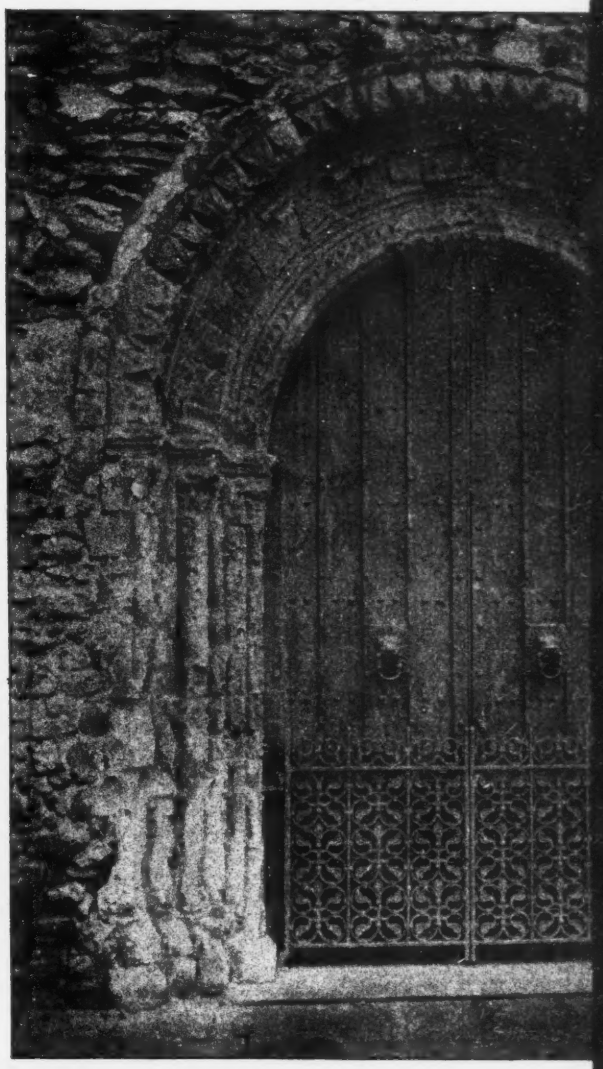

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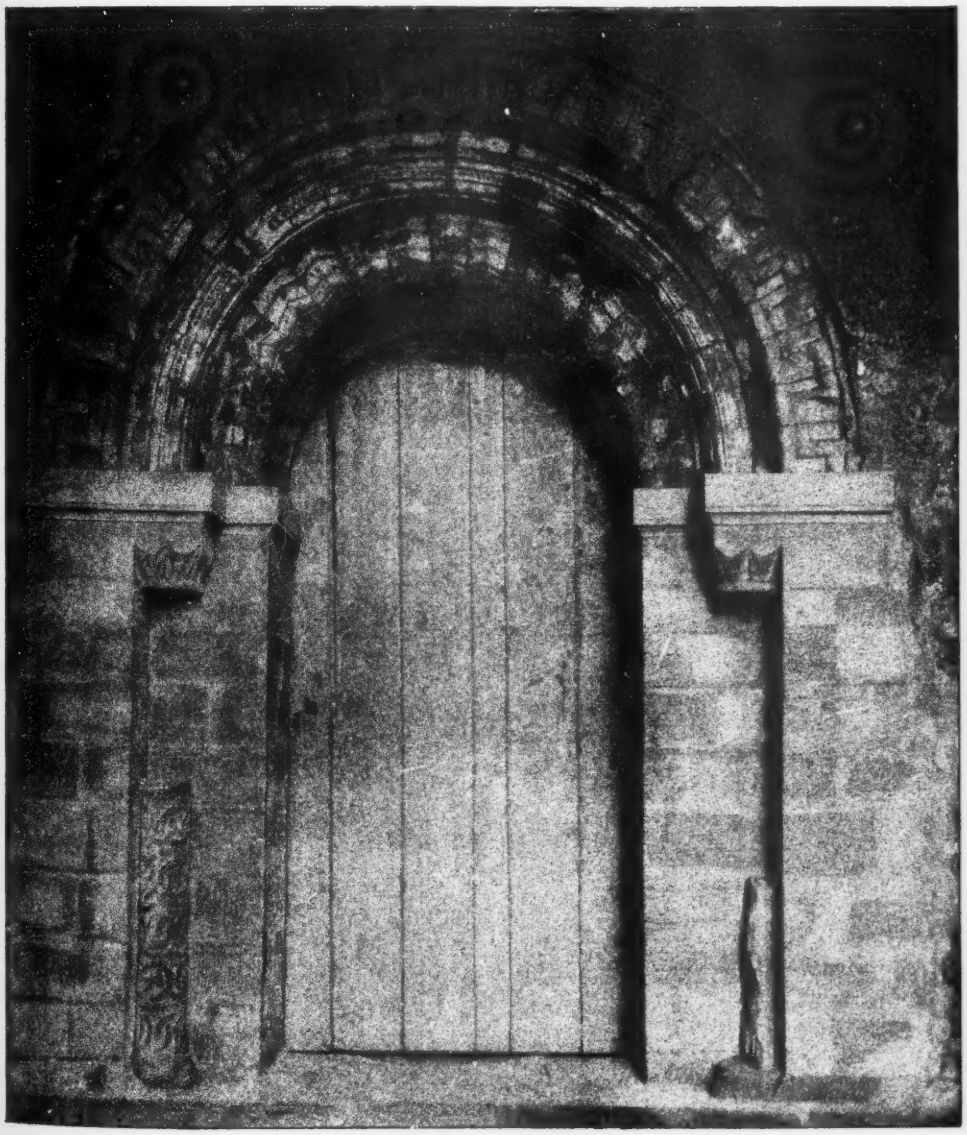
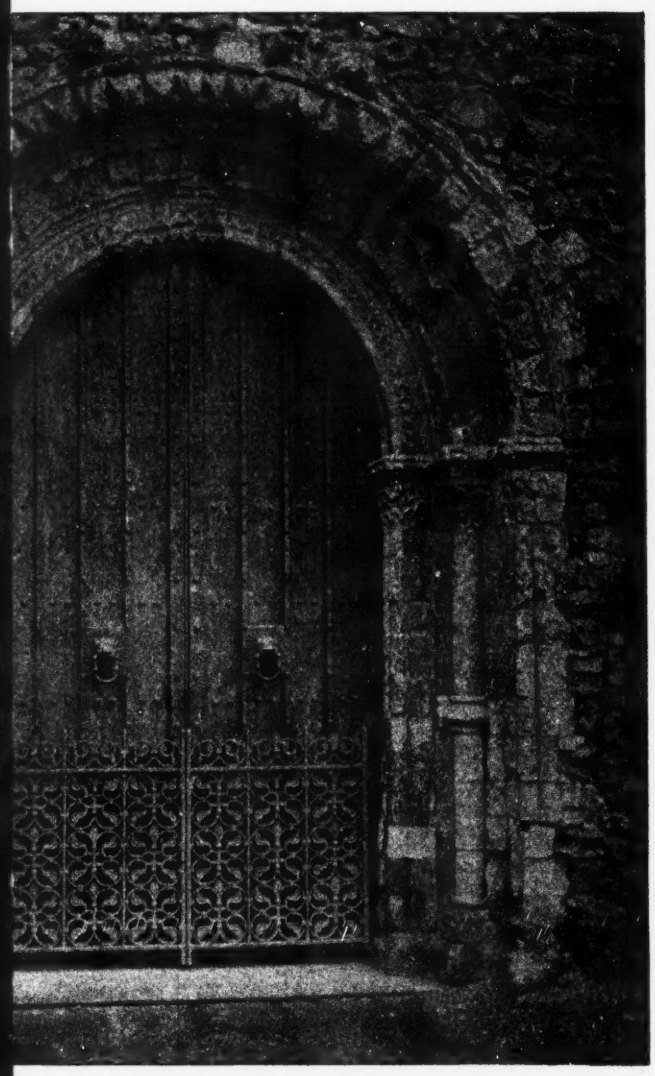


SUPPOSED TO BE THE DOOR THAT BECKETT PASSED THROUGH
TO EAST SIDE, CLOISTERS, CANTERBURY CATHEDRAL.

WEST DOORWAY, BREDGA

NORMAN DOORWAYS IN



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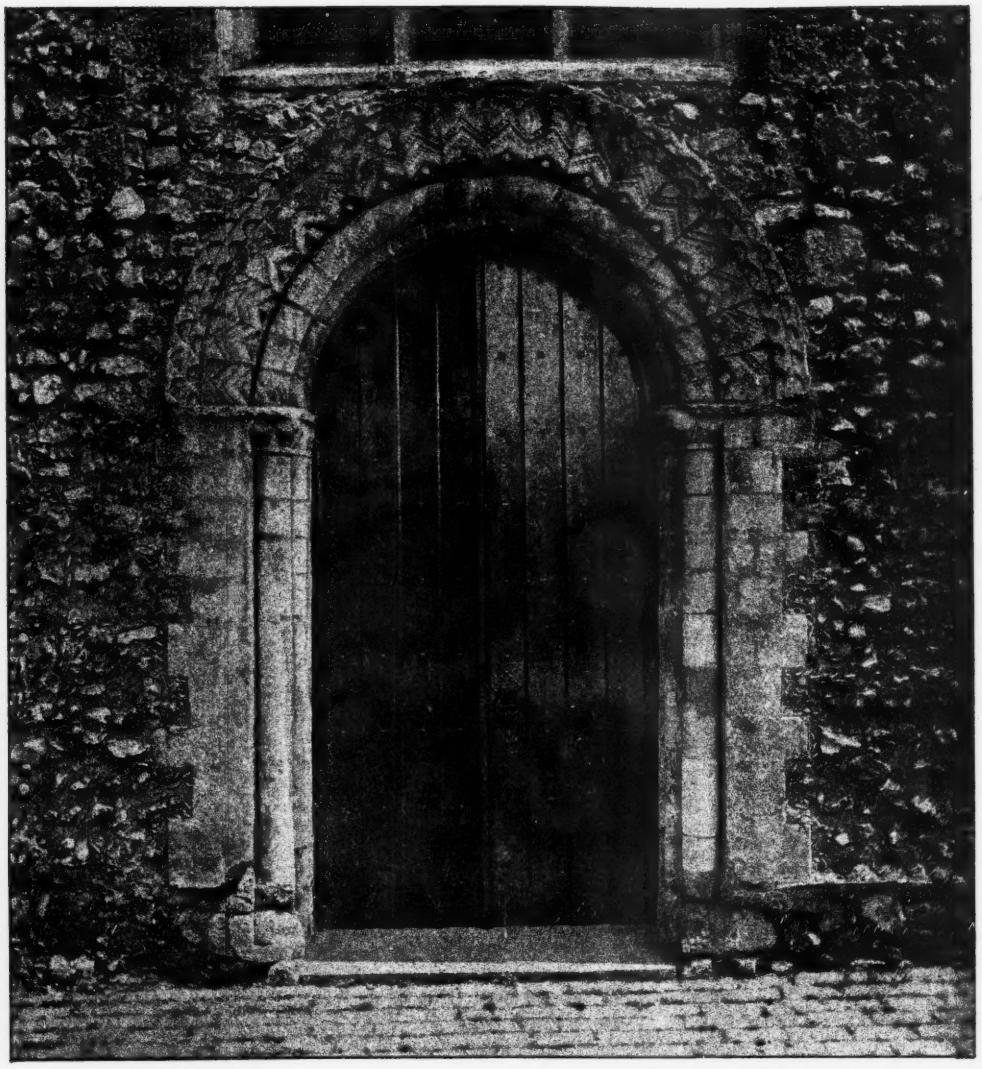

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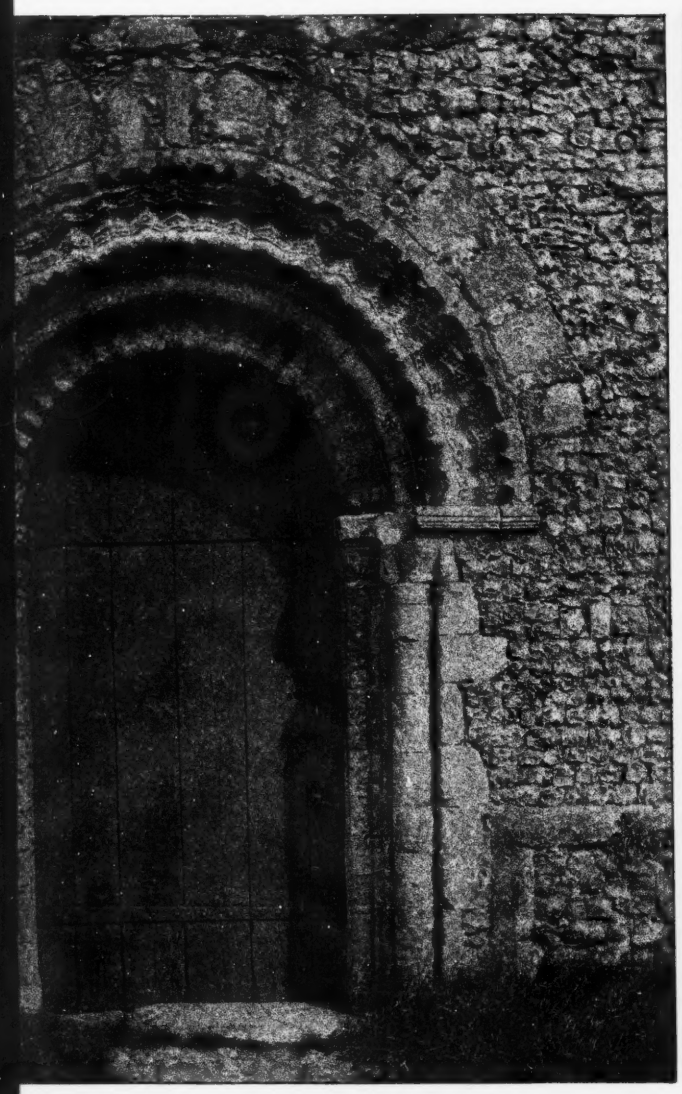

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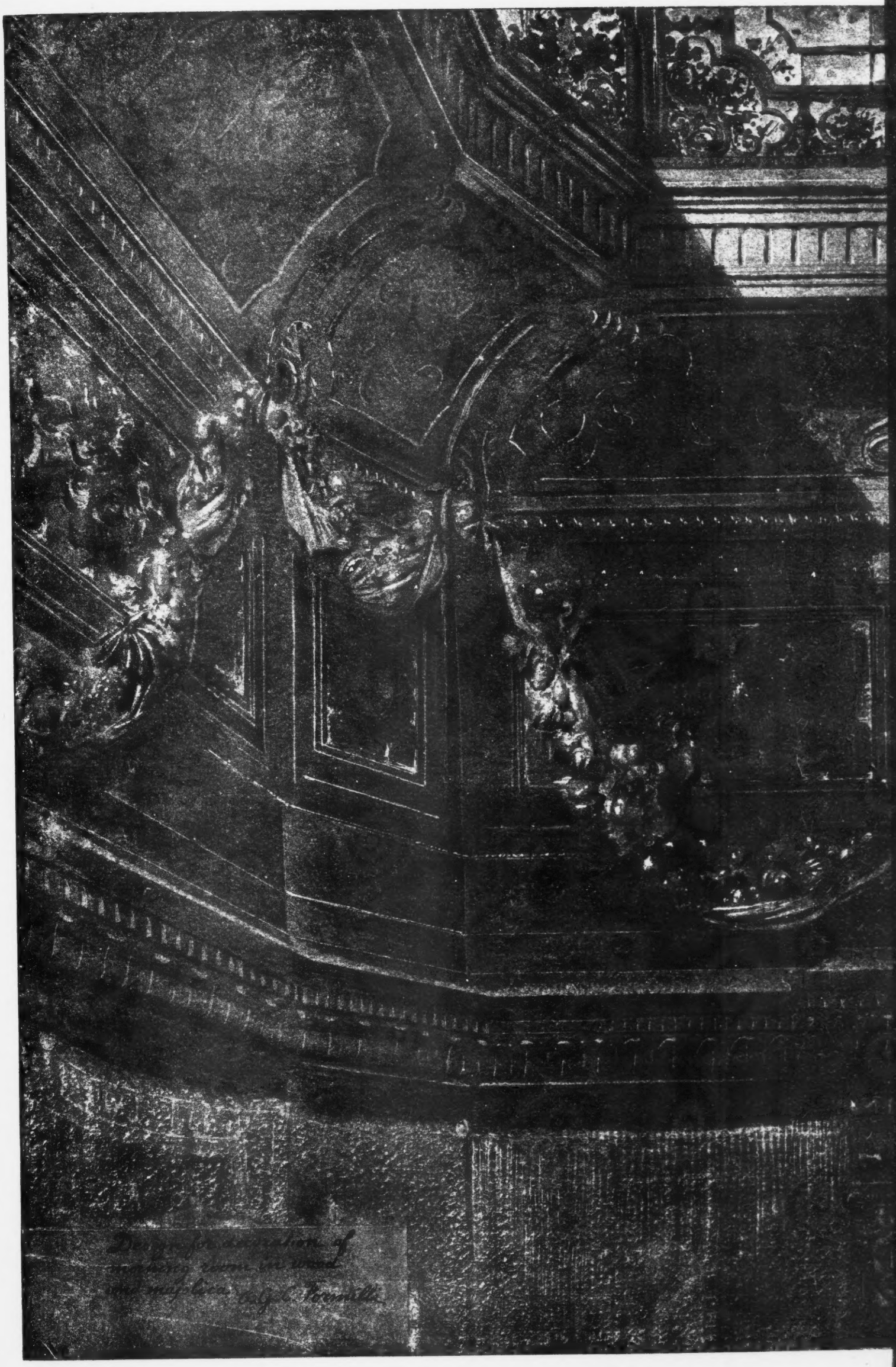
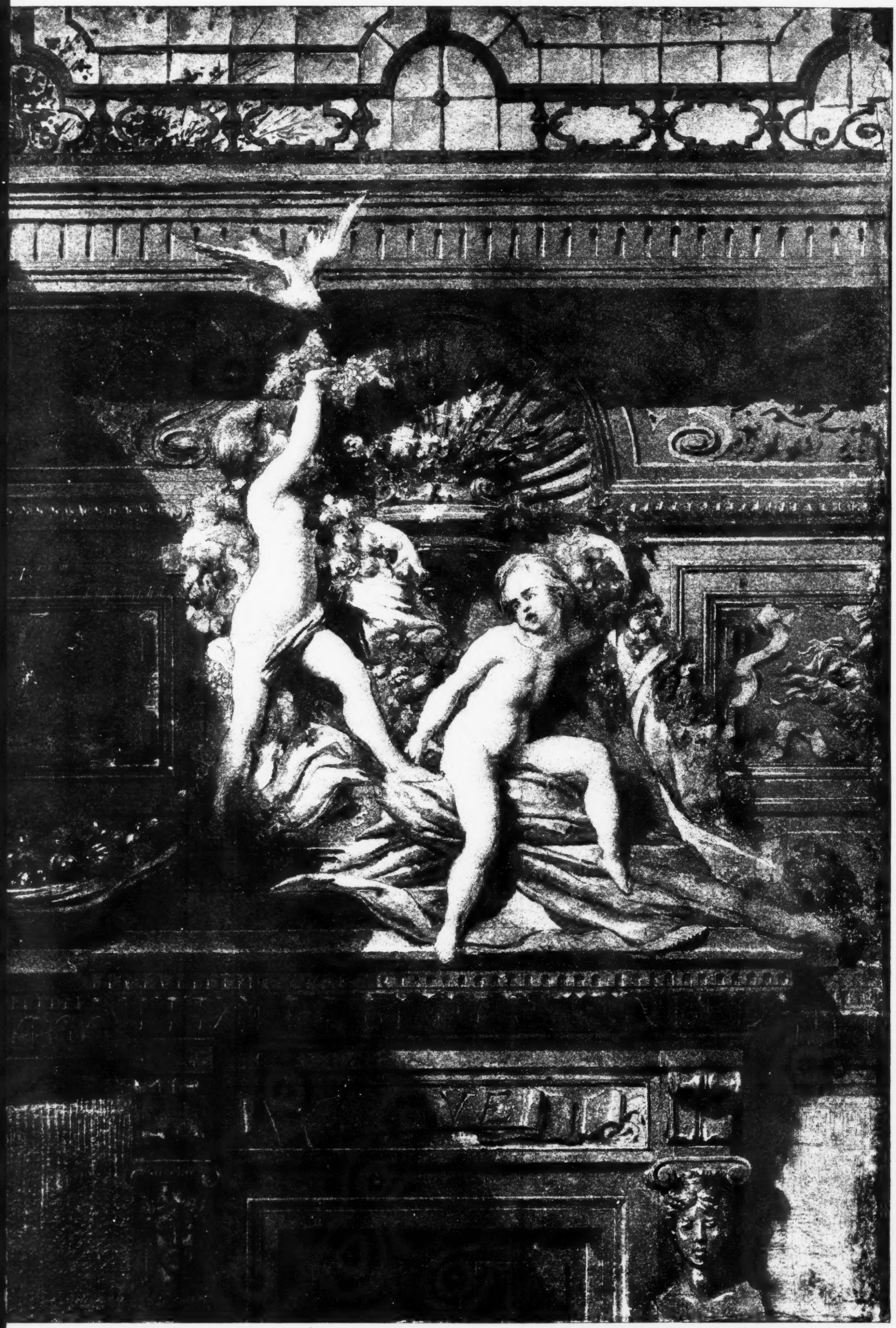
ORMAN DOORWAYS IN KENT.





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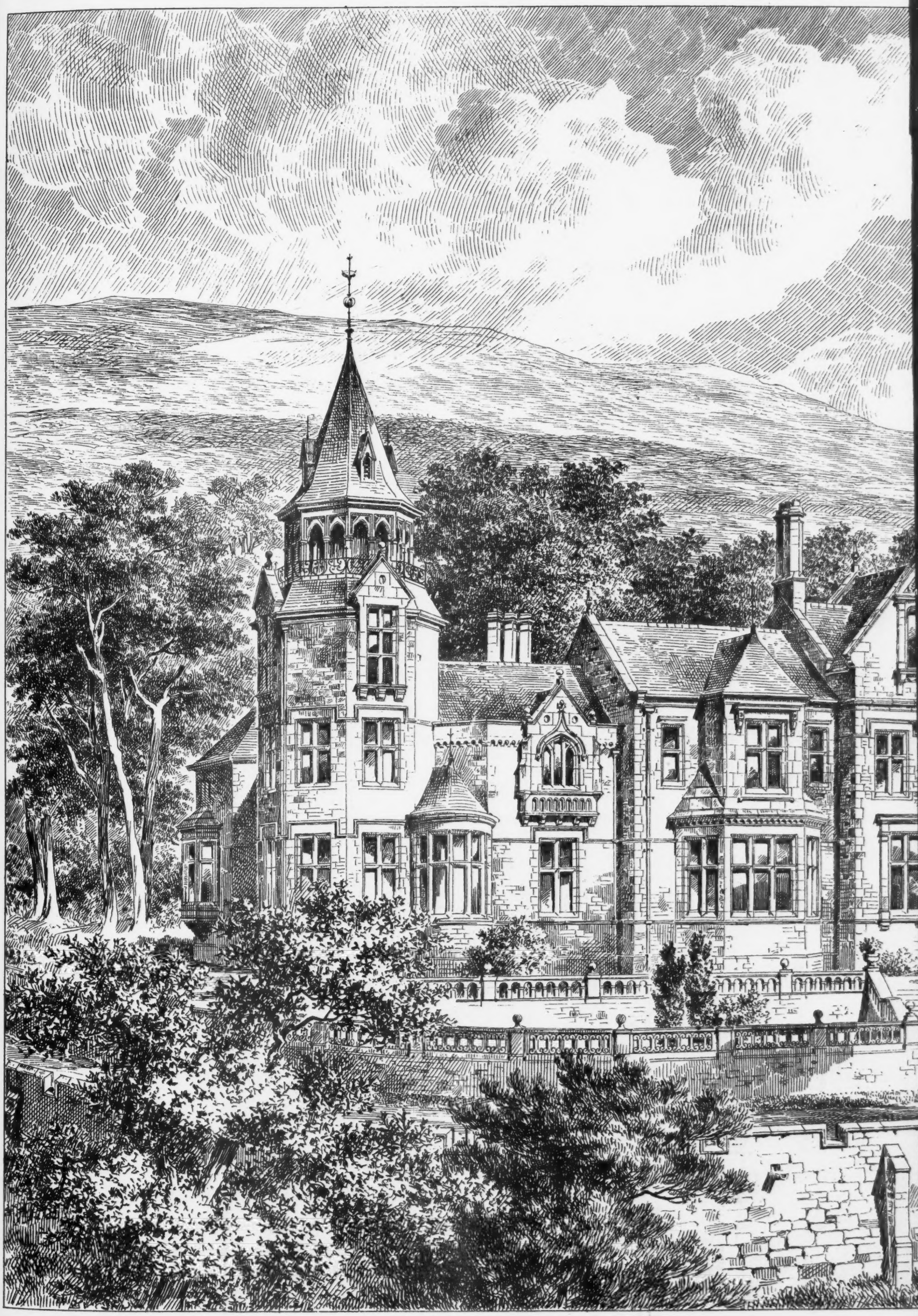

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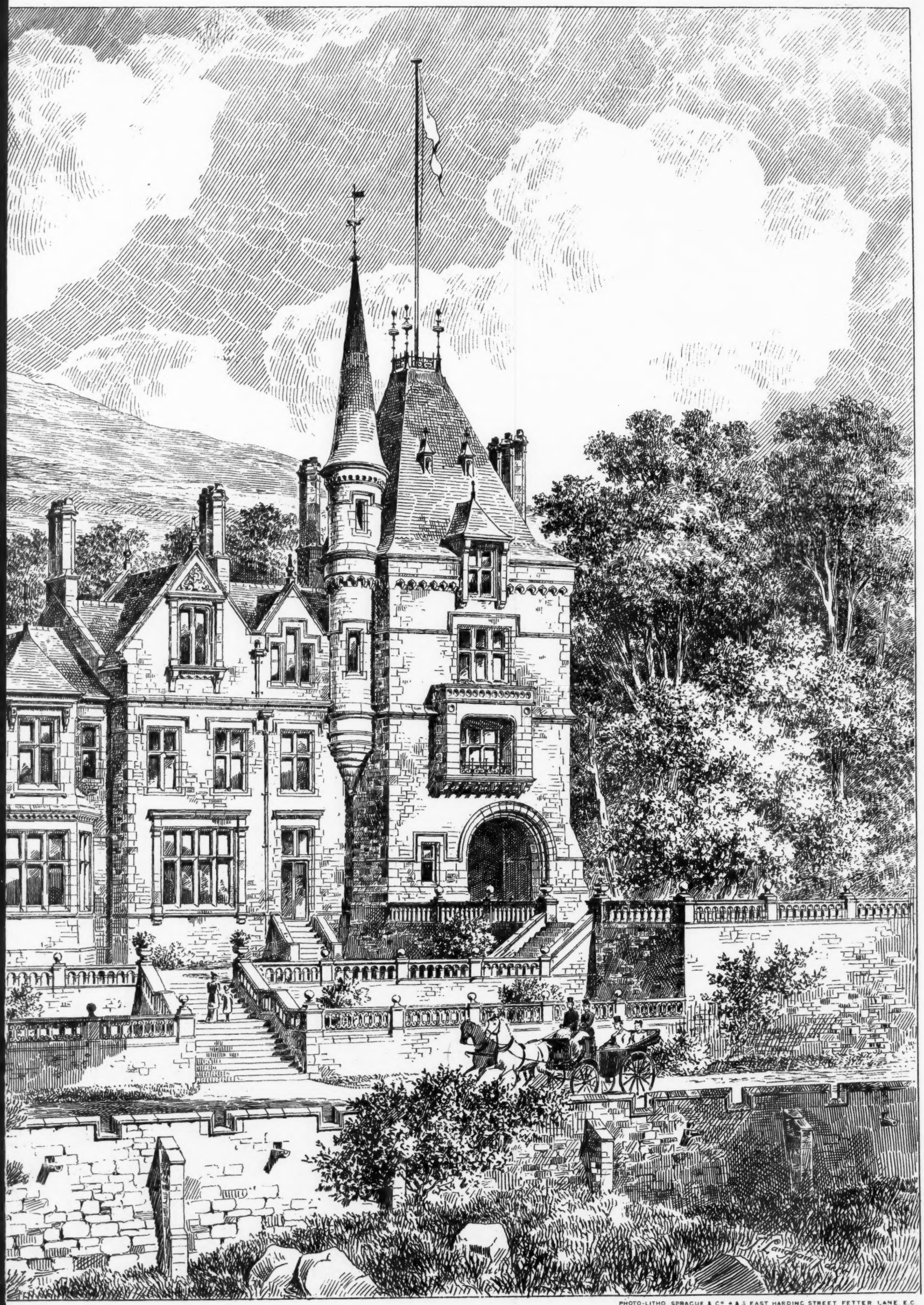

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